BAILEYA

A Quarterly Journal of Horticultural Taxonomy

Vol. 5 No. 4

DECEMBER 1957

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Published at the Bailey Hortorium of the New York State College of Agriculture, a Unit of the State University of New York, at Cornell University, Ithaca, New York

BAILEYA. - A quarterly journal devoted to the botany of cultivated plants and especially to their identification, nomenclature, classification, and history in cultivation. Editor: William J. Dress.

Price: $2.00 per year, net, postpaid, in funds payable at par in United States currency in New York. Single copies (current or back numbers): 50 cents each. Address subscriptions and requests for back numbers to The Bailey Hortorium, Cornell University, Ithaca, New York. Make all remittances payable to BAILEYA.

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Cornell University, Ithaca, N. Y.

BAILEYA
Vol. 5 December 1957 No. 4

Mailed at Ithaca, N. Y., December 30, 1957.

The Correct Name for Setcreasea "tampicana"

F. J. Hermann[1]

A rather striking foliage plant, with attractive rose-pink flowers, was recently received for identification from the Glenn Dale Introduction Garden where it was designated as "Purple Queen." The whole plant was suffused with deep violet-purple, although Mr. Harold F. Winters informs us that foliage of seedlings obtained in the greenhouse reverted to green. The Glenn Dale plant was obtained indirectly from Mr. Charles Pennock, North South Nursery Company (Pennock Gardens), Rio Piedras, Puerto Rico, who found the original plant in a window box at the Tampico Airport and, believing it to be an undescribed species, distributed it under the unpublished name Setcreasea tampicana. The species has been in cultivation for several years at least, since a specimen in the U.S. National Arboretum Herbarium was received from the Bailey Hortorium (as S. tumida (Lindl.) K. Schum. & Sydow) in 1952.

So far as can be determined, the species was new at the time it came into the trade, but it was learned through Dr. William J. Dress that in the meantime it has been described under another name, Setcreasea purpurea B. K. Boom, its publication in Acta Botanica Neerlandica 4(2):167-168 (1955) having been detected by Dr. H. E. Moore, Jr. It is unfortunate that the name S. tampicana has been applied for some time to the plants distributed in the horticultural trade and is still current. It is the purpose of this article to bring to the attention of horticulturists, before "S. tampicana" becomes an established name in horticultural literature, the fact that it is a synonym of the validly published and correct name S. purpurea.

The original description of Setcreasea purpurea is accompanied by an excellent line-drawing of the species. The description itself, however, is rather brief and, since the periodical in which it is published is not widely available in this country, it may be worthwhile publishing the following more detailed description (drawn up from plants grown at Glenn Dale) and the accompanying photograph of the plant. The only difference noted in the Glenn Dale plants from the one described from the botanical gardens at Dormstadt, Germany, by Dr. Boom is that in it all of the filaments bore several multicellular hairs, whereas he refers to the filaments as "exteriora glabra vel pilis 1-2, interiora pilis 3-8 obsita."

[1] Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture, Beltsville, Maryland.

Fig. 45. Setcreasea purpurea.

Stem, leaves, and involucral bracts succulent and rather rigid, suffused with deep violet-purple, the only green apparent being on the upper surface of the leaf-blades toward the base and in the thin, membranous bracteoles; root fibrous; stem stout, 35 cm. high, 5-6 mm. in diameter, suberect or ascending, simple or occasionally branched; internodes 2-10 cm. long; leaves 3-16 cm. long (the lower 3-7 cm. long, the middle to 16 cm., the upper 8-9 cm.), 2.5 - 3.5 cm. wide, divaricate or drooping, broadly oblong-lanceolate, rather abruptly acute, gradually narrowed to the sheathing base, the blades thick, glabrous below, very sparsely pilose above, the margin entire, short-ciliate and sparsely long-pilose, the sheaths 7-10 mm. long, the lower, at least, sparsely pilose without, the margin densely pilose at the U-shaped mouth; inflorescence a pair of terminal fascicles of 9-16 subsessile flowers subtended by one or two foliaceous, conduplicate involucral bracts 5-8 cm. long, 3-4 cm. wide, the floral bracts 10-12 mm. long, broadly ovate, abruptly acute, white-hyaline and membranaceous; pedicels 3 mm. long (elongating in fruit to 6 mm.), white-translucent, the upper two thirds long-villous with white, ascending hairs 4 mm. long; sepals erect, 9 mm. long, 2.5 mm. wide at the middle, narrowly oblong, hyaline, flushed with green especially along the midrib, about half the length of the petals, sparsely villous at the base without, otherwise glabrous; petals 17 mm. long, 11 mm. wide at the center, rhomboid, distinctly clawed, (the claws evidently weakly coalescent for 1-2 mm. at the base), bright pink within, whitish pink without; stamens 15-17 mm. long, inserted in pairs near the base of the petals; filaments deep pink (white below the anthers), with 10-12 divergent multicellular hairs (2-3 mm. long) midway above the base; anthers versatile, 0.75 mm. long, 2 mm. wide, the orange-yellow connective 1.5 mm. wide; style 12 mm. long, pink (white below the stigma); stigma flattish, bluntly trilobed.

Dr. Boom relates Setcreasea purpurea to S. brevifolia (Torrey) Schumann & Sydow, from which he distinguishes it on the basis of the purple-violet coloration of the stems, leaves, and bracts, the glabrous calyx, roseate corolla, and subglabrous filaments. To the writer it seemed perhaps closer to the recently described S. hirsuta Markgraf (Mitteilungen, Botanische Staatssammlung München 5:166-167 [1952]) from which it differs in its broadly lanceolate rather than linear leaves (2.5 - 3.5 cm., rather than 4-6 mm., wide) which are not canaliculate and pilose below, nor restricted to the lower half of the plant, in its much larger (5-8 cm., rather than 1-2 cm., long) non-striate involucral bracts, and in its larger (18 mm., rather than 8 mm., long) flowers.

From Setcreasea tumida, with which S. purpurea has been occasionally confused, it is abundantly distinct in its long, non-tumid internodes, glabrous stem and sepals, non-involute leaves, strictly terminal inflorescence, very short pedicels, and plane petals.

Plantsmen in Profile, IV: Robert G. Wilson, Wyndham Hayward

Mary H. Moon

Robert G. Wilson

One of the characteristics that marks the true plantsman is his concern for botanical accuracy in plant names and descriptions. He is an amateur botanist as well as a horticulturist. Such a man is Robert Gardner Wilson, whose outlet for these interests is his nursery, Fantastic Gardens, at South Miami, Florida.

One must see Fantastic Gardens and talk with Mr. Wilson (or Bob, as he is known to a host of friends and clients) and his wife, Catherine, to best appreciate their work. The visitor may find them at work with recent introductions, or engrossed in the pollination of some promising aroids, but always he finds them ready to respond to the questions of their clients with unfailing courtesy, or to question in turn the botanists, horticulturists, or guests from other countries, who frequently call at this unusual nursery.

The plants housed in the three and a half acres of greenhouses and lathhouses that compose Fantastic Gardens offer a view of some of the more unusual and little-known foliage subjects and orchids of the American tropics. According to Mr. Wilson, many of his plants have not been indexed and even the genera of a good number are yet unknown, so it is difficult to convey a picture of the true inventory by merely making a list of the plants that are known there.

One can say little about these unnamed plants except that the identities of some of them are slowly being learned. On occasion, species unknown to science appear, one such being the recently described Episcia dianthiflora which was described from plants brought to Fantastic Gardens from Mexico. When Mr. Wilson's resources for identification fail (his library includes some 120 horticultural and botanical volumes), he turns to botanists, those of the Bailey Hortorium included, for help. Species with definite horticultural worth are listed temporarily under fancy names in the Fantastic Garden lists until determinations of their botanical status are made.

Mr. Wilson has pointed out the peperomias from Brazil and Jamaica as examples of this sort: Peperomia 'Silver Heart', 'Moneywort', 'Blackie', 'Club-shaped' and 'Trailing Beauty'. The species formerly named 'Red-veined' was identified only a few years ago as P. ornata and subsequently listed by its botanical name. The same thing was done with two philodendrons, P. minarum and P. Williamsii, which were listed as 'Dwarf Selloum' and 'Espirito Santo' until scientific names were given to them last year. In 1958 Mr. Wilson plans to introduce eight new philodendrons to which botanical names are thus far unassigned.

It is apparent from these examples that this firm offers a number of plants new to American gardens. Bob Wilson has personally collected some of these from horticultural sources and wild areas in the tropics, for trial and eventual distribution. In fact, thirty per cent of the new plant material in his nursery has come from his own collecting. In 1952 he was in Chiapas, southern Mexico; in 1954, he covered parts of Cuba and the Bahamas; in 1955 he traveled in Brazil and Trinidad. Bromeliads, orchids, aroids, and gesneriads were the groups he searched for especially, for they are his major interest and best meet the needs of the majority of his five thousand clients.

Suburban and rural homeowners, collectors, private and commercial growers have learned to count on him for foliage plants with specific or limited use as well as for those more commonly known and sought. His collection of "Jewel Orchids," for instance - comprising species of the genera Anoectochilus, Erythrodes, Haemaria, and Macodes - is a group for only the skilled plantsman to attempt. Their strikingly beautiful foliage makes them most desirable, but they are difficult to grow. The unusual and excellent episcias (Gesneriaceae) at Fantastic Gardens are known to a large number of plant lovers. The current gesneriad list includes a number of Wilson's selections, first introduced in 1950 and 1953. Episcia 'Silver Sheen', 'Acajou', 'Chocolate Soldier', 'Emerald Queen', 'Frosty', 'Harlequin', 'Kitty', and 'Sylvan Beauty'. Other rare plants first introduced by Fantastic Gardens, which are believed to be offered only by this firm, are:

Aechmea fasciata 'Purpurea'
Episcia cupreata 'Variegata' (E. splendens of horticulture)
E. lilacina 'Panama' (E. chontalensis of Wilson)
Hexisea bidentata
Maxillaria Camaridii
Nidularium Scheremetiewii
Oncidium pusillum
Ornithocephalus bicornis
Vriesia imperialis

One soon discovers that the credit for having introduced or reintroduced a tropical plant to American gardens is not a primary

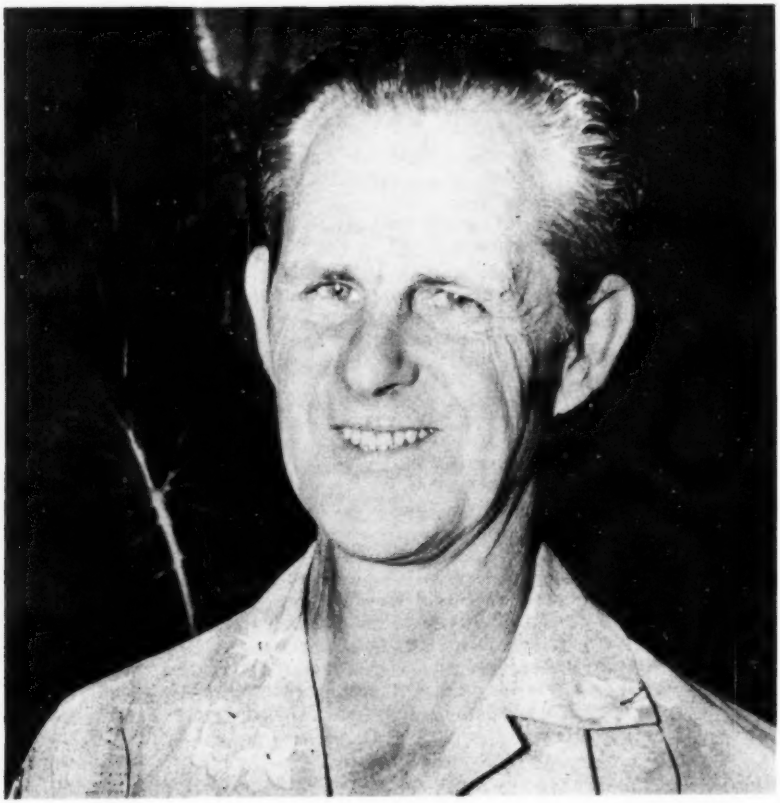

Fig. 46. Robert G. Wilson.

concern of Mr. Wilson's. "So many of the things that we have brought in," he has written us, "have turned out to have such a specific and necessarily limited demand that I have allowed them to slip out into the trade without fanfare. Some plants have been distributed only to collectors and never appeared in any of my lists." Moreover, it is not his policy to indicate all new introductions as such because he believes that the average customer must hear about a plant for some time from several sources before its importance is built up in his mind and the plant registers as "new."

As his collection of plants grew, Bob Wilson increasingly undertook to improve the ones showing most promise of horticultural merit by creating hybrids and by making selections from those imported for testing. Currently listed plants resulting from his controlled hybridization program are Philodendron × Wilsonii (P. giganteum × P. radiatum); unnamed Alocasia hybrids, A. longiloba × A. Lowi var. Veitchii and A. cuprea × A. Watsonii; Anthurium × carneum (A. × Andreanum × A. nymphaefolium); and a hybrid Hoffmannia (H. Ghiesbreghtii × H. Roezlii).

The Wilsons have worked extensively with the arborescent philodendrons in the past several years, making a good many hybrids. However, since the intermediate forms developed have proved less desirable than the parent species, the species are being self-pollinated, as they are more distinct. Another of their major interests is the orchid species which produce small plants and flowers, and which are currently being hybridized to develop colorful spray types. Bromeliads are another group they are now working with.

The Wilsons' accomplishments at Fantastic Gardens are all the more striking when one considers the relatively short time they have worked with tropical foliage plants and orchids. It was not until 1936 that they started a nursery in Miami. A year later they moved their small plant stock and founded Fantastic Gardens at a location Mr. Wilson describes as twelve miles from downtown Miami and an equal distance from the city's International Airport.

In the first three years of operation, cut flowers, cacti, and succulents were offered. The owners recall having flowered over seventy species of Aloe alone at that time, and had about sixty different kinds of miniature cacti. Memory is their only record of the stock of these years, because their inventory and papers were later destroyed. Then, in 1940, a few tropical plants were added to the firm's inventory. The gradual shift in specialization to tropical foliage plants and orchids began in response to the change from the Mediterranean to the contemporary style of architecture in Florida. In 1945, when it became apparent that these kinds of plants were to be in demand, they concentrated on the establishment of a nucleus of tropicals.

Fantastic Gardens has been in continuous operation except during the war years, 1942 to 1945, when the Wilsons were in Haiti. Mr. Wilson was employed by the Société Haitiano-Américaine de Développement Agricole to develop nurseries and plantations of Cryptostegia, then thought to be a good, fast growing source of rubber for wartime industry. The Haitian flora captured his interest and he spent his free time studying it and selecting specimens for an herbarium collection.

For three years following their return to Miami, the Wilsons reversed their roles in the nursery work. Catherine Wilson became a full-time nurseryman while her husband devoted his free evenings and weekends to doing whatever he could to help out. This was necessitated by his full-time employment, first with the United States Department of Agriculture in a vegetable disease experiment during 1946, and then with the Dade County (Miami) Park Department for the next two years. The latter position was one he had previously held from 1940 to 1942, that of superintendent of the park department nursery and of the Fairchild Tropical Garden areas under the park's jurisdiction. When he decided to devote all his time to his own firm, he returned to a business that had grown steadily under his wife's direction.

A few figures are in order to round out the picture of the nursery's activities today. There are eight employees who assist with plant propagation and testing, and secretarial help. Eighty-five per cent of the kinds of plants currently offered are produced on the premises. The remainder are imported directly from horticultural and other sources in the American tropics. These are used primarily for testing, and only one of every fifteen to twenty, Mr. Wilson estimates, proves suitable for his trade. Orchids are the exception, in that plants may be imported with the idea of offering them soon after their arrival. Sixty-five per cent of Wilson's original stock came from the American tropics, thirty per cent from North American firms, and the small remainder from Europe.

Bob Wilson's original interest in plants may be traced to his boyhood in his hometown of Waltham, Massachusetts. "My grandmother came to live with my folks when I was ten years old," he explained, "and because of her great interest in plants, I naturally became interested, too. I can remember vividly the two weeks' job each fall moving her house plants from under the trees in the yard into their various positions in our thirteen-room house. I don't believe we ever took count, but almost every window was lined with plants when they were all in their places. It seems as though my grandmother was always having me help her divide and propagate plants to give to her friends, but somehow the number of plants at home always seemed to increase."

Years later, when he was studying at Massachusetts State College, his interest in plants prompted him to spend his summers working at Brown's Perennial Nursery at Amherst, Massachusetts. The great depression came along while he was finishing his schooling, and until 1935 he "did various things such as one does during depression years." Then in the spring of 1935, he came to Miami, and in the following year established his own nursery.

The contributions of the Wilsons to the knowledge and appreciation of tropical foliage plants and orchids thus began. Their accomplishments are already considerable and will surely increase as they continue to introduce the nation's plant lovers and botanists to some of the lesser-known, but most interesting, plants of the tropics.

Wyndham Hayward

Location and environment occasionally combine to serve as major factors in shaping a man's work. He may have every prospect and intention of pursuing one career, only to find that, upon moving to another city or state, new opportunities present themselves that lead him far afield from his original occupation and plans.

This happened to Wyndham Hayward. When this native Rhode Islander decided that Florida would become his family's future home in 1927, he began there as a newspaper man with a job on the Orlando Morning Sentinel. Back in Rhode Island he had been reporter, book columnist, and copy writer for the Providence Evening Bulletin the two years previous, following his graduation from college (Brown, A.B., 1924; Harvard, M.A., 1925).

Orlando, however, is in the heart of the great citrus and ornamental horticultural section of central Florida, and the attractions of journalism faded before the fields of blooming amaryllis and the lath houses full of exotic tropicals which he had known before that, in the North, only as rare greenhouse plants.

Mr. Hayward's latent boyhood interest in plants revived. (As a boy in grammar school, Mr. Hayward was thrilled at winning a five-dollar gold piece in Wickford, R.I., for the best vegetable garden in his grade school class one summer.) His acquaintance and ensuing friendship with such noted plantsmen as Dr. Hamilton P. Traub, the late Theodore L. Mead, Dr. H. Harold Hume, and other well-known amaryllis enthusiasts and growers in Florida were added encouragement to learn the intricacies of growing and breeding amaryllis and other subtropical bulbs and tubers.

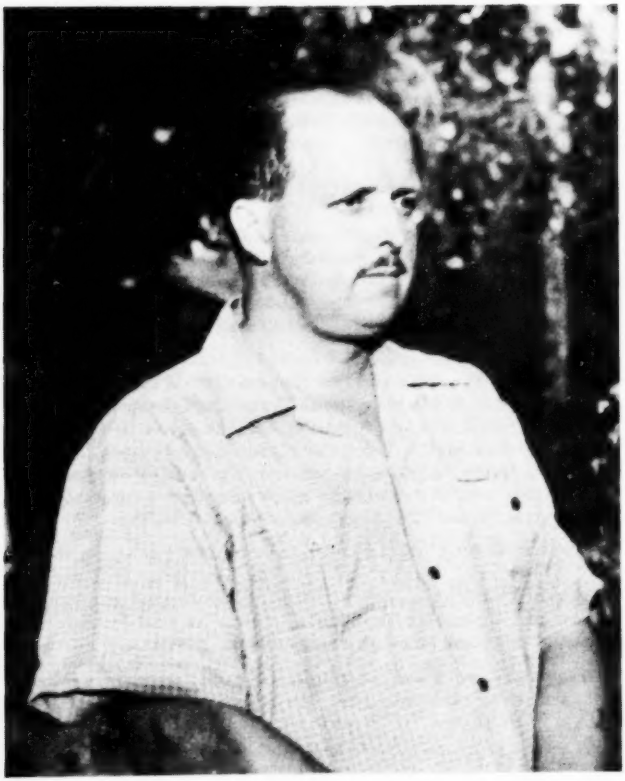

Fig. 47. Wyndham Hayward.

In 1934, after a few years preliminary study and research, he established the Lakemont Gardens at Winter Park, just north of Orlando. This was seven years after his arrival in Florida. A brother Richard, whose health was a main cause of the family's moving to Florida, died in 1933, and Mr. Hayward has been associated with his mother, Mrs. Walter Hayward, now 86 years old, in the operation and management of his business ever since. At Lakemont Gardens he has specialized in growing, breeding, and importing choice amaryllises, with heavy emphasis also on other amaryllids and such other genera as Hemerocallis, Gloriosa, Achimenes, Crinum, Caladium, and the "ginger-lilies" (Zingiberaceae).

Mr. Hayward obtained his amaryllis and hemerocallis stocks from the best sources, including the pioneer Florida growers, Dr. T. L. Mead and Dr. Henry Nehrling, and also received plants of the Betscher and Stout varieties of day lilies from northern nurseries. At that time (in the early 30's) there were scarcely a half-dozen well-known day lily hybridizers in the world, and he is gratified to have been instrumental in inducing such famed day lily breeders as Dr. H. P. Traub, Ralph W. Wheeler, and Mrs. Bright Taylor to take up this work. Among his own day lily introductions which have achieved wide distribution are 'Emperor Jones', 'Minnie', 'Babette', 'Antoinette', 'Araby', 'Salmon Rose', and 'Tahiti Belle', though these have been mostly superseded by improved varieties by this time.

In cooperation with Dr. Traub and other scientists, Mr. Hayward has engaged in research to solve propagation and cultural problems of hybrid Amaryllis, Lycoris, Hemerocallis, storing, forcing, and shipping of the bulbs, and many other phases of their handling and growing. During the last twenty-five years or so Herbertia (the yearbook of the American Plant Life Society, formerly the American Amaryllis Society) and other magazines have published his many articles on rare plants, particularly those of a bulbous or tuberous-rooted nature. Herbertia also recorded his numerous winnings in flower shows of the old American Amaryllis Society at Orlando, some of which drew attendances, over a period of several days, of 25,000 persons.

The progress of Lakemont Gardens suffered a set-back with the coming of World War II. For five years Mr. Hayward returned to his first love, journalism, as city editor and sports writer for the Orlando Evening Star. (He still writes occasional reviews of music, drama, and flower shows on request.) His plant interests, due to labor shortages, were seriously neglected during this busy wartime period and when he returned to his horticultural interests in July, 1946, it was virtually a matter of "starting from scratch" again.

Because of labor conditions in presently booming Florida, he has been unable to give as much time to hybridizing and growing Amaryllis and Hemerocallis, but has devoted himself to merchandizing top-quality material in these lines, largely through mail order channels. In recent years he has been an important importer of the Ludwig, Warmenhoven, and Van Meeuwen strains of the new and improved Dutch named Amaryllis hybrids. These are propagated vegetatively by the thousands in Europe at this time; no American nurseries have gone into this phase of horticulture so intensively to date, mainly because of the high labor costs involved. He has also built up his commercial collection of Crinum species and hybrids, and has paid much attention to the collection of various showy and charming species of the great ginger family, including the genera Curcuma, Kaempferia, Zingiber, Hedychium, Costus, etc. Some of these, such as the dainty dwarf species of Kaempferia, are doing famously as pot plants throughout the North; others, such as the larger species of Costus, Curcuma, and Hedychium, are striking and effective subjects for gardens in the Lower South around the Gulf Coast into southern California.

Recently, Mr. Hayward has taken a special interest in the fancy-leaved caladiums, especially the arrow- and the lance-leaved varieties, which were grown and admired by the pioneer caladium hybridizers, Nehrling and Mead, but had never attained any wide distribution. He now has one of the two outstanding collections of named cultivars and new hybrids of these dwarf, colorful beauties which are gradually attaining a well-deserved warm reception and popularity among flower lovers. The Massachusetts Horticultural Society gave Mr. Hayward a vote of commendation in 1949 for a showing of foliage of the new arrow and lance types shipped to Boston for the purpose.

Mr. Hayward describes his firm as a "small personal specialized affair, mainly devoted to growing, promoting, and selling bulbs and tubers adapted to Florida, the Lower South, and in the North under glass or in the garden in summer." He is mainly interested in "neglected, new, or forgotten items of an attractive nature and reasonably easy culture." He does not grow orchids (other than the easier terrestrials), Nepenthes, or other ultra-tropicals requiring special greenhouse care.

His "small" business, besides the circularizing of 15,000 customers, requires the full time application of himself, part time labor of one hired hand, and the assistance that his elderly mother enjoys giving him in book-keeping, packing bulbs for mailing, etc. He has virtually no greenhouse facilities at this time, but has a small propagating house and a quarter-acre lath house, besides eight acres of valuable hammock land on the east side of Lake Berry, which threatens momentarily to become engulfed by surrounding subdivisions.

Tending his plants and operating the business occupy most of Mr. Hayward's days and evenings comfortably. At times, when orders pile up, he may work till four o'clock in the morning packing bulbs, but he takes pride in personally overseeing the packing and shipment of every order. His leisure is spent in research, cultural affairs, and similar recreation, speaking to garden clubs (in recent seasons the garden club dates run from 20 to 30 annually), and reading for pleasure alone. His reading tastes run to plant science, plant-exploration travel accounts, history, biography, and an occasional novel.

He is a director of the Bromeliad Society, the American Gesneria Society, vice-president for the Southeast of the American Plant Life Society (of which, as the American Amaryllis Society, he was an organizer in 1933 with Dr. Hamilton P. Traub). He is, in addition, a director and public relations chairman of the Hispanic Institute in Florida, was formerly a director of the Central Florida Symphony Orchestra, and takes pride in the fact that the late Lord Aberconway, then president, nominated him to fellowship in the Royal Horticultural Society twenty years ago.

He is also currently a member of the American Horticultural Society, the Massachusetts Horticultural Society, and the Central Florida Camellia Society, and, because of his interest in Oriental literature and history, has been a member of the Royal Asiatic Society for many years. He also has an enthusiastic interest in the Discovery Period of Hispanic-American history.

Mr. Hayward takes particular care to make his catalogues interesting and informative, and they reflect some of the studies he has made. Background material and illustrations may be drawn from his own library of several hundred horticultural and botanical works, and he calls on botanists and research centers here and abroad for assistance in the correct identification of newly introduced material, some of which may be new to cultivation or long-lost to gardeners in America.

Now fifty-four, Mr. Hayward forsees many more years of studying, writing, experimenting, and growing his beloved plants, an outlook which should indeed please American amaryllis enthusiasts.

The Designation of Cultivar-names

George H. M. Lawrence

The concept of the cultivar as a category distinct from the botanical variety is generally accepted. The suitability of the term cultivar as more precise than that of the admittedly ambiguous "variety" is rapidly becoming recognized in the United States, especially by people concerned with ornamentals. More and more of these people are talking and writing about cultivars instead of " varieties."

The International Code of Nomenclature for Cultivated Plants adopted in 1952 makes several provisions concerning cultivar-names and their designation. The new edition now in preparation promises to be even more helpful and explicit. It seems desirable to review some of these directives and the thinking behind them.

1. The Code provides that the name of a new cultivar is to be a vernacular or "fancy" name and must be markedly different from a botanical epithet of Latin form.

> That is to say, a cultivar-name is to be in a modern language; 'Golden Gleam' and 'Jones Triumph' are examples. These names have no resemblance to names in Latin form, such as lutescens or Jonesii.

The reason for this departure from the former practice of using names in Latin form is that among populations of wild plants botanists continue to recognize groups that are varietally distinct from the typical form of the species. These are treated as botanical varieties. They are Latin or latinized names, underscored when typewritten and set in italics when in print. Cultivar-names in a modern language are not likely to be mistaken for botanical varieties.

2. The new Code is also expected to provide that a cultivar-name published before January 1, 1959, must not be rejected because it is Latin. Such a name shall be distinguished typographically from a botanical epithet and must have a capital initial.

> For example, Juniperus chinensis var. Pfitzeriana is a cultivar, not a botanical variety recognized as a wild population in China. It was first given this name by Franz Spaeth in 1899. To distinguish it typographically as a cultivar, its name should be written Juniperus chinensis cv. 'Pfitzeriana'.

In former times it was customary to give some cultivars Latin names. This was done particularly for those believed likely to persist for long periods, such as many cultivars of woody plants; for those easily grown from seed, such as color variants other than the typical form; and most commonly in those genera and species where the number of cultivars was small. Because of the presumed greater permanence in cultivation of Latin-named cultivars, their names were picked up by editors of encyclopedias, manuals, and gardening books. Even to the present, these names have been treated in most reference works as nomenclatural equivalents of botanical varieties. The introduction of the category cultivar is changing this. Current nomenclatural codes provide that the Latin-named and the fancy-named cultivar be treated alike.

This change is founded on sound biological and practical bases. Modern plant breeding activities have increased the number of cultivars of hybrid origin beyond the effective usefulness of latinized names. Search for and selection of sports or mutations have been intensified and have resulted in the introduction of many novelties also. These efforts are increasingly common in many groups of woody plants where earlier there were but few cultivars recognized - e.g., Ilex, Juniperus, Magnolia, and Rhododendron. It is absurd to give special consideration to Latin-named cultivars of such genera while failing to give equal or any consideration to those having fancy names. From the horticultural standpoint, the latter often are the more important.

At the same time, existing cultivar-names in Latin form must be preserved in the interest of nomenclatural stability. To accomplish this, and to treat all cultivar-names as of equivalent standing, those in Latin form are no longer italicized as are those of botanical varieties. According to a proposal adopted for the new edition of the Code for cultivated plants, each cultivar-name in Latin form will always have a capital initial as given in the example above.

However, after allowing the originators and registrars of cultivar-names ample time to learn of this provision, the new Code will set a date - presumably January 1, 1959 - after which no new names in Latin form will be acceptable. This means that new cultivar-names published after that date in Latin form are to be rejected even if capitalized and treated typographically like those in vernacular form.

Furthermore, if after this closing date of admissibility a cultivar is given a Latin name and its publication is accompanied by a Latin description as required by the botanical Code for new botanical varieties, the new Code for cultivated plants promises to authorize the rejection of that Latin name and the substitution of a new cultivar-name in the vernacular. A hypothetical example of such a contingency follows:

> A cultivar given the name Iris innominata var. lutescens after January 1, 1959, could be renamed Iris innominata 'Yellow Gem' by the originator (or registering authority) but it could not be renamed Iris innominata 'Lutescens'.

3. The Code makes it clear that the cultivar-name shall be distinguished from a Latin botanical epithet by enclosing the cultivar-name in single quotation marks, or the abbreviation cv. may be placed before the cultivar-name.

> Thus, the name Juniperus chinensis cv. Pfitzeriana is further marked as that of a cultivar by being written Juniperus chinensis cv. 'Pfitzeriana'; the name may be shortened to Juniperus 'Pfitzeriana' or even 'Pfitzeriana' Juniper.

This use of single quotation marks to distinguish a cultivar-name is alien to earlier horticultural writings. There are good reasons, however, for its introduction.

In the first place, it makes it unnecessary to use the designator "cv." The single quotation marks set the name off, identifying it as that of a cultivar. Most trade catalogues and lists, and many journals and gardening books, use a trinomial when designating cultivars and few, indeed, use the conventional "var." before varietal names.

Secondly, use of single quotation marks distinguishes a cultivar-name in Latin form at once from a botanical variety name of the same spelling. When single quotation marks are used with such a name, one always knows it designates a cultivar. A botanical variety name conventionally is printed in italics or (as in typescript) is underscored - yet several current check-lists issued by American plant societies place Latin names of both botanical varieties and of cultivars in roman type-face. Neither is followed by the name of the author of the plant name, and in the absence of single quotation marks no one can tell which plant is a cultivar and which is a botanical variety.

Thirdly, botanists use double quotation marks when it is desired to indicate a misapplied name or an illegitimate alternate spelling. To use double quotation marks for cultivar-names (as has been advocated by some) would be confusing.

There is a fourth reason for using single quotation marks that may not be encountered so frequently as the others, but which is indeed important. It has to do with the combined use of group or grex names with cultivar-names. In plants of hybrid origin, such as in many rhododendrons, orchids, or even vegetable and crop plants, the seedling progeny of a particular cross exhibits a degree of variability within itself, yet as a group is distinguishable from progeny of other crosses in the same genus. This progeny of a particular cross is called a grex (plural, greges). Where it is desirable to give the progeny a collective name, the present Code stipulates that the name should be followed by the word grex or the

abbreviation g. An example is Cattleya (Princess Royal g.) 'Fire Queen'.

It is now apparent that use of the identifying "grex" or "g." is impractical. It is anticipated that the new Code will provide for deletion of both the parentheses and the designator, allowing the above plant to be named Cattleya Princess Royal 'Fire Queen'. It immediately is obvious that the single quotation marks are the sole means of separating the cultivar-name from that of the grex. The current practice of some orchidists of both italicizing and capitalizing grex names becomes most confusing, since often it is not possible to determine whether the name is actually Latin or not, and when it is, one identifies it automatically with a specific epithet. Grex names should never be italicized, but they should be capitalized.

Editors of some horticultural journals, especially those of more popular appeal or written for commercial interests, place all Latin names in roman type face - those of species as well as of varieties. These same editors, in accounts restricted to a particular genus, generally use varietal names without preceding them by their identifying binomial or even the initial of the generic name. When no italics are used, it becomes the more imperative that single quotation marks enclose cultivar-names in Latin form, for this is the only way to distinguish them from similar names of botanical varieties.

Some check-lists and journals designate cultivar-names by writing them in large and small capital letters. This practice is possible when the appropriate type faces are available, but few typewriters are so equipped and the practice does not lend itself to uniform usage. It cannot be adopted in publications such as "Baileya" which are reproduced photographically from typewritten copy. Furthermore, the scattering of names written in capital letters through lists and texts is unesthetic.

The advocation in the Code of the use of single quotation marks is not the brain-child of an individual, nor is it the protégé of any one society. This method was selected by the International Committee as most practicable for all - writer, typist, printer. Single quotation marks fill the need, furthermore, by being meaningful, unambiguous, inoffensive to the eye, and economical of space.

It is natural to resist change or innovation. This is especially true when reasons for the change may not be fully appreciated or understood. It is easy to follow old paths, even though indirect and serpentine. Enclosing cultivar-names in single quotation marks is a change and an innovation. Acceptance by many organizations is already a matter of record. Its widespread adoption in society journals and lists is a prediction based on clear-cut trends. I encourage those who study the matter and recognize the advantages and validity of the proposal to bring the case for the use of single quotation marks to the attention of the editorial boards of their respective societies.

Fig. 48. A fruiting stem of Musa 'Gros Michel' in one of the United Fruit Company plantations, Honduras. Photograph courtesy of Tropical Research Department, United Fruit Co.

Musa and Ensete
The Cultivated Bananas

Harold E. Moore, Jr.

The growing of bananas as raw fruit for the United States market is an important business in the tropics of the Western Hemisphere. Elsewhere, bananas are often a staple item in the local diet. The fruit of some clones is eaten raw; the fruit of others is generally larger and unpalatable unless cooked. The former are often termed "dessert bananas," the latter "plantains." Species bearing inedible fruits are also grown for ornament in the tropics and subtropics or in northern greenhouses. Musa textilis and M. Basjoo are grown for fiber.

Because bananas have proved subject to diseases and, to a lesser extent, pests, the edible kinds have been studied from many points of view. Nowhere have studies been more elaborate than at the Imperial College of Tropical Agriculture in Trinidad, where members of the Regional Research Centre have concentrated their efforts on breeding and classification for over 30 years.

Although work continues, some of the major problems in classification have been resolved and the results have appeared in a series of articles in technical journals. Of particular importance is the light that has been thrown on the taxonomy and origins of the edible banana in a recent report by N. W. Simmonds and K. Shepherd in The Journal of the Linnean Society of London (Botany). A reassessment of all the bananas, useful or ornamental, now cultivated becomes necessary. It is proposed, therefore, to summarize these important publications here for the benefit of the horticulturist. A detailed list of sources is appended.

The plant family Musaceae, to which the bananas belong, is small in size and unusual in character. In a conservative interpretation, it includes the bird-of-paradise flower (Strelitzia) from South Africa, the travelers-tree (Ravenala madagascariensis) from Madagascar, an allied genus, Phenakospermum, from British Guiana, the relatively large and highly ornamental American genus Heliconia, and the two genera Musa and Ensete, into which the bananas are now divided. A recent trend evidenced by the conclusions of Hutchinson, Nakai, and Simmonds (in correspondence) is to recognize two or three families in this assemblage with the Musaceae restricted to include only Musa and Ensete.

These last two genera are distinguished from the others by the spiral arrangement of the leaves and of the bracts on the inflorescence, which bears female or hermaphrodite flowers within the lower bracts, male flowers within the convolute or imbricate upper bracts; by the united segments of the more or less two-lipped corolla; by the calyx of united sepals which soon splits on one side; by the numerous ovules in the ovary which matures into a fleshy berry with seeds lacking an aril. In the edible bananas the berry is parthenocarpic (developing without fertilization) and seedless.

Musa and Ensete have long been kept together in the former genus, but contemporary students of the family separate them. Musa consists of species that have several pseudostems in a cluster (the "stool" of the banana grower). The pseudostems are nearly uniform in diameter, each individual pseudostem dying when it has produced fruit on its terminal inflorescence, although the cluster continues to proliferate. Ensete has only a single pseudostem, which, when developed much above the ground, is greatly enlarged at the base. Seeds of Musa are small (3-11 mm. in diameter) with a straight embryo, the pollen is smooth, and the chromosome complement is 10 or 11 in reproductive cells. Seeds of Ensete are generally large (5-17 mm. in diameter) with a T-shaped embryo, the pollen is granulose-papillose, and the chromosome complement is 9 in the reproductive cells. None of about 8 species of Ensete is known to produce edible fruit. Musa, with about 30 species, has at least two species with edible fruit. Hybrids between one of these and an inedible wild banana, or polyploids of one, account for our common eating and cooking bananas.

Before an accounting of the species of Musa, consideration should be given to the origin of our edible sorts. Using the techniques of plant breeding, cytology, and taxonomy, workers at Trinidad have examined both wild and cultivated bananas. They have concluded that nearly all the edible bananas (except for the Fe'i or Fehi banana described later) have evolved in several ways from two wild species widely distributed in Asia from India, Ceylon, and Assam to the Malay Peninsula, Malay Archipelago, Philippine Islands, New Guinea, and certain Pacific islands.

The two species involved are Musa acuminata and M. Balbisiana. Both wild (seeded) and edible (parthenocarpic seedless) forms of Musa acuminata occur as normal diploid plants. In addition, edible triploids of M. acuminata are known. Musa Balbisiana occurs naturally only as seeded diploid plants.

Simmonds and Shepherd, basing their conclusions on a broad background of tested information, suggest that the edible bananas have arisen in five main stages of evolution: (1) through the evolution of parthenocarpy and sterility in diploid M. acuminata; (2) through outcrossing of edible diploids of this species to wild forms

Fig. 49. Inflorescence of Musa 'Gros Michel' showing young fruits and withered female flowers at the base and male flowers and bud at the tip. Photograph courtesy of Tropical Research Department, United Fruit Company.

of M. acuminata and M. Balbisiana, followed by human selection among the edible products of these crosses; (3) through the occurrence of triploidy in M. acuminata itself, and further in crosses between M. acuminata and M. Balbisiana, resulting in two genetically distinct triploids; (4) through the occurrence of tetraploid hybrids, one of which is known naturally, others experimentally; and (5) through somatic mutation (sporting) as in other vegetatively reproduced crops. The hybrids have developed independently in several places but the center of origin of edible bananas may be broadly suggested as Malaysia with Malaya and possibly islands in its immediate neighborhood as probable primary center, with secondary centers of diversity rather widely dispersed around the outer fringes from India to the Philippines and New Guinea (Simmonds in correspondence).

Thus, we find that naturally occurring edible bananas (as opposed to artificially produced forms) may be derived entirely from Musa acuminata as edible diploids or triploids, or as diploid, triploid, and tetraploid hybrids between M. acuminata and M. Balbisiana. There now appears to be some connection between the origin of a given clone and the manner in which the fruit is used - whether it is eaten raw or cooked. Simmonds (in correspondence) states, "It now appears that all acuminata types and some hybrid clones have more or less sweet fruits but that many clones have fruits more or less starchy at maturity. Thus starchiness is connected with Balbisiana hybridity but is not an invariable consequence of it."

With such a clear understanding of origins worked out, it is possible to clarify a situation in nomenclature that has long been troublesome. The genus Musa (an Arabic name for the genus adopted by Linnaeus, who further connected it with the Muses and with Antonius Musa, physician to the first Emperor of Rome, 63-14 B.C.) had its recognized beginning with Linnaeus in 1753, when he described Musa paradisiaca, an edible species, and M. Bihai. The latter has since been transferred to the genus Heliconia, so that Musa paradisiaca has become the type of the genus. Linnaeus later added another edible species of Musa, M. sapientum. The two names have been variously applied in the past. Sometimes M. paradisiaca has been used to include those bananas eaten raw (dessert bananas), M. sapientum to include those used cooked (plantains); sometimes one has been made a variety of the other.

The studies at Trinidad show that clones considered typical of both Linnaeus' species are of hybrid origin, derived from M. acuminata and M. Balbisiana. The clone 'French Plantain' is thought to represent M. paradisiaca; the clone 'Silk Fig' (also known as 'Apple' or 'Rastali') M. sapientum. Before conclusive evidence to show the hybrid nature of both Linnaean species was available,

Cheesman had applied the name M. paradisiaca to the cultivated bananas believed to have been derived from wild M. acuminata, considering the former species a cultigen. The name M. sapientum was used for the bananas of hybrid origin. In the light of present evidence, such a solution is no longer adequate. Musa × sapientum must be considered a synonym of the earlier M. × paradisiaca, both epithets prefixed with the hybrid sign to denote the nature of the "species."

Simmonds and Shepherd have correctly suggested that the names Musa × paradisiaca and M. × sapientum may be rejected from the nomenclature of the wild bananas. It would be well, perhaps, were it possible to reject them entirely. The genus Musa, however, is based on M. × paradisiaca; hence, for nomenclatural reasons, the name must be retained (as must Iris × germanica Linnaeus, the type species of Iris) and applied, as required by the International Code of Botanical Nomenclature, to all clones known to be of hybrid derivation from M. acuminata and M. Balbisiana. In strict adherence to the Code, those edible bananas derived from M. acuminata alone, both diploids and triploids, must be referred to that species. To be technically correct, therefore, the following widely known clones would be referred as follows: to M. acuminata -- 'Sucrier' (diploid), 'Gros Michel', 'Pisang Masak Hijau' (or 'Lacatan' of Jamaica, but not of the Philippines), 'Green Red', and 'Dwarf Cavendish' (all triploid); to M. × paradisiaca -- 'Poovan' ('Mysore'), 'Silk Fig' or 'Silk', 'Horn Plantain', 'French Plantain', 'Bluggoe' (all triploids but not necessarily of the same genetic constitution).

In general practice, however, it is likely that another method -- the use of clonal names with the genus only -- will be more useful. This method is common among those who grow plants and finds ample precedent in a number of other genera, the cultivars of which are of unknown composition or of such complex nature as to defy an attempt to produce a concise usable system of naming that represents the genetics of the plants. Examples are found in the apples, in Pelargonium, Saintpaulia, Camellia, Begonia, Nymphaea, and above all in the orchids. Such an approach has the advantage of being more precise than the use of broad botanical categories and makes possible the distinction of such well-known bananas as those mentioned above as well as many of unknown origin. There are many hundreds of named clones of bananas, only a few of which have been closely studied. Simmonds (in correspondence) suggests that it is also desirable, when possible, to intercalate the genetic constitution of a clone if it is known, A standing for a complement of acuminata chromosomes, B for Balbisiana. Under usual conditions, it is easier to refer to Musa 'Gros Michel' or to Musa (AAA) 'Gros Michel' than to Musa acuminata 'Gros Michel'; to Musa 'French Plantain' or Musa (AAB) 'French Plantain', Musa 'Bluggoe'

or Musa (ABB) 'Bluggoe' than to these clones following M. × paradisiaca.

While the genetics and nomenclature of the edible bananas used in the United States are considerably better understood than they were thirty years ago, a second group of bananas, known as the Fe'i or Fehi bananas, still presents many problems. Clones of this alliance are to be found in a few collections in the United States but they are used as ornamentals and are not general in the trade. One has been listed -- as M. Fehi -- since 1955 by California Jungle Gardens. In the Pacific islands, however, the Fe'i bananas are a more important group. The plump fruit, unpalatable when raw, is cooked in various ways. Very many clones, often local and known by vernacular names, are cultivated. Distinguishing marks of the Fe'i bananas as a group are found in the violet-purple sap which exudes when the petioles are cut, and in the erect inflorescence. Some clones produce seeded fruits but most are seedless.

The study of edible bananas derived from Musa acuminata and M. Balbisiana has shown us that the botany of bananas is complex indeed. In order to use names correctly, it is necessary to know much more about the Fe'i bananas and particularly whether they are derived from a single species or from more than one. Simmonds (1956) suggests that a wild banana of New Guinea (Musa Maclayi F. von Mueller, 1885) is the probable major source (and perhaps the only source) of the Fe'i complex. The evidence, however, is not yet detailed.

Several Latin names apply to forms in this complex, names that have been much confused in the literature of both botany and horticulture. Musa Fehi Bertero ex Vieillard (in Annales des Sciences Naturelles [Botanique] ser. 4, 16: 45 [1862]), based on plants from New Caledonia, is one name frequently used. Musa troglodytarum Linnaeus (Species Plantarum, ed. 2: 1478 [1763]), based on plants from Amboina described by Rumphius in his Herbarium Amboinense (1747), is almost surely the oldest name for a member of the group as MacDaniels has shown. Others are known principally in botanical writings. If it were clear that the Fe'i bananas were uniform in character and in origin, the problem of selecting and using names correctly would be simplified. But our present knowledge of these bananas is not sufficiently precise to bring botanists into agreement.

Until studies comparable to those of the Musa acuminata-Balbisiana bananas are completed for the Fe'i bananas, it seems preferable to avoid an attempt to use specific names, perhaps erroneously and thus compounding confusion. When fancy names are

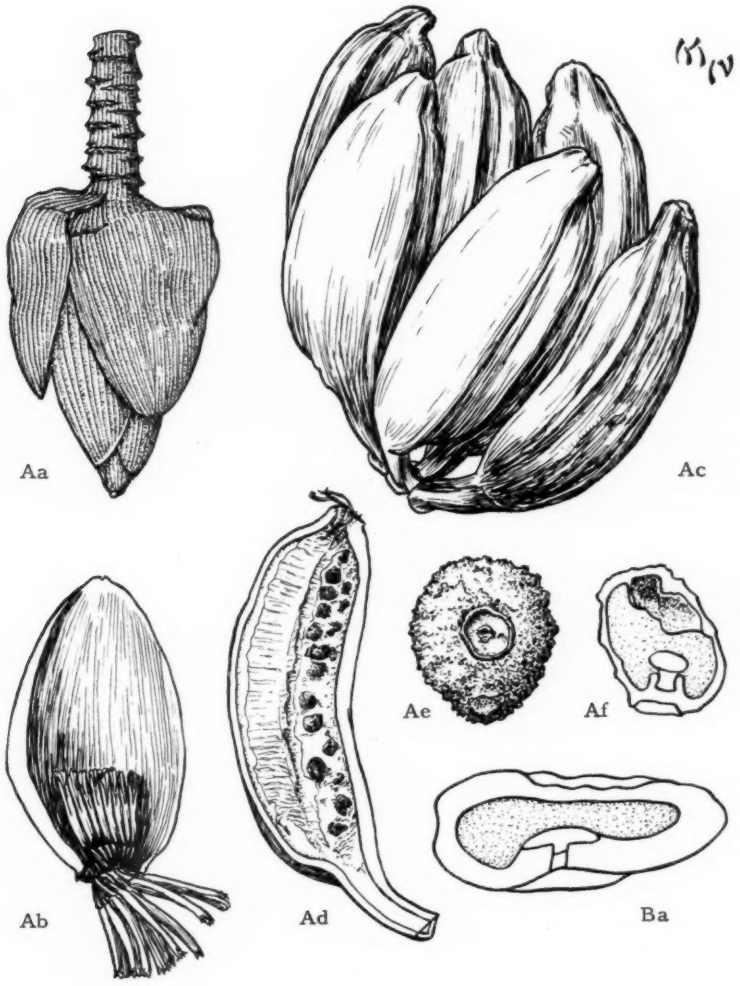

Fig. 50. A, Musa Balbisiana: a, male bud x 1/3; b, bract and staminate flowers x 2/5; c, cluster of fruits x 1/2; d, fruit in vertical section x 1/2; e, seed x 4; f, seed in vertical section to show embryo x 4. (Material for illustration courtesy N. W. Simmonds.) B, Ensete ventricosum: a, seed in diagrammatic vertical section to show embryo (adapted from Lane).

known, these may be used with some confidence. MacDaniels, for example, lists and describes many forms from Tahiti such as Musa 'Aiuri', M. 'Rureva', M. 'Afara'. For plants lacking fancy names, the inclusive designation Fe'i banana may suffice in general writing and even in technical writing. Manuscript for Hortus III, where precision is required normally, lists the Fe'i bananas in such fashion with explanatory notes.

The species of Musa grown as ornamentals are more numerous but less important. It is practicable, therefore, to continue with a key for the identification of the species of bananas in cultivation and with brief discussions of the species of the two genera concerned.

It will be obvious from the list of doubtful species that Musa and Ensete are not completely understood. Problems in the definition of wild species (of which Musa has about 30, Ensete about 8) and the identity of cultivated plants abound. The large size of most species deters collectors from making adequate specimens and these, even when carefully prepared, are scarcely sufficient. Careful detailed field study documented with photographs, extensive notes, and specimens is required. Growers who are situated in areas where these two genera can be grown successfully have a splendid opportunity to contribute to the clarification of problems, particularly those concerning ornamental types, through study of their plants.

Key to Cultivated Species of Musa and Ensete

1. Pseudostems not conspicuously thickened at the base, clustered, the plant continuing to proliferate although each individual stem dies after fruiting; pollen smooth; seeds small, 3-11 mm. in diameter, with a straight embryo. Chromosome no.: n = 10, 11. . . . . MUSA

2. Seeds not developed, the fruit edible.

3. Sap violet-purple. . . . . .Fe'i bananas

3. Sap clear or milky[1]. . . . . .M. acuminata and M. × paradisiaca

2. Seeds developed, the fruit inedible.

4. Bracts of the male bud more or less grooved, often dully glaucous, rarely or never polished, rolled within one another or more or less overlapping in bud, usually strongly rolled backward on fading; seeds occasionally nearly round, more often compressed from top to bottom, sometimes lens-shaped, smooth, tuberculate, or irregularly angulate, with a marked or obsolete projection opposite the hilum. Chromosome no.: n = 11.

[1] Differences among the many edible forms of M. acuminata and M. × paradisiaca are not ordinarily discernable without the use of techniques impractical for the average grower. They can, however, be distinguished by persons trained in these techniques. For general purposes, the use of clonal cultivar names will suffice. When nomenclatural precision is required and the genetic composition of a clone is known, the clone can then be referred to its proper binomial.

5. Inflorescence pendulous or semi-pendulous from the first, the fruits in development reflexing toward the base of the axis; flowers many to a bract, in 2 series; bracts commonly dull-colored, green, brownish, or dull purple; pseudostems commonly exceeding 3 m. in height.

6. Bracts yellow-green, sometimes brown-tinged outside, pale yellow within and transversely corrugate between the ridges; seed flattish, black, warty, 6-8 mm. across, 4 mm. high; rhizomes elongate. . . . . M. Basjoo

6. Bracts red, dull purple, brownish purple, or yellow outside, pink, dull purple, bright crimson, or yellow inside; seeds round or flattened, smooth or minutely warty; rhizomes short.

7. Pseudostem more or less heavily blotched with brown or black; peduncle downy or hairy; bracts acute at apex, one lifted at a time, red, dull purple, or yellow outside, pink, dull purple, or yellow inside but constantly pale at the base; seeds angular-depressed, 5-6 mm. across, 3 mm. high, black and minutely warty or smooth. . . . . M. acuminata

7. Pseudostem not or only slightly blotched; peduncle glabrous; bracts obtuse at the apex, several lifted at a time, brownish purple outside, bright red to the base inside; seeds nearly round, 5-6 mm. across, 4-5 mm. high, black and minutely hairy. . . . . M. Balbisiana

5. Inflorescence erect, at least at the base, so that the fruits do not reflex in development but point toward the apex of the axis; flowers few to a bract, usually in a single series; bracts brightly colored, often red; pseudostems commonly less than 3 m. high.

8. Fruit hairy, splitting lengthwise at maturity with the valves curling back to expose the mass of pulp and seeds. . . . . M. velutina

8. Fruit neither hairy nor splitting. . . . . M. ornata
(see also M. Mannii)

4. Bracts plane, firm in texture, polished on the outside, rarely or never glaucous, strongly overlapping in bud, not or only slightly rolled back on fading. Chromosome no.: n = 10.

9. Bracts persistent, bright scarlet with green or yellow leaf-like tips. . . . . M. coccinea

9. Bracts soon deciduous, green or greenish brown or purplish brown.

10. Sap bright violet-purple; fruit coppery orange; bracts green; inflorescence erect. . . . . Fe'i bananas

10. Sap clear or milky, not colored; fruit yellow; bracts greenish brown or purplish brown; inflorescence horizontal but the male bud pendulous. . . . . M. textilis

1. Pseudostems, when developed, conspicuously swollen at the base, solitary (though in nature sometimes growing in clumps when seeds of a fruit have germinated in situ) and dying after fruiting; pollen granulose-papillose; seeds relatively large, 15-17 mm. in diameter, with a T-shaped embryo. Chromosome no.: n = 9. . . . . ENSETE

11. Bracts dull claret-brown inside, orbicular; seeds dark brown or black to 12 mm. across. . . . . E. superbum

11. Bracts red, purple, or green, longer than broad; seeds black.

12. Leaves borne along the stem, the plants canna-like; seeds 7-8 mm. across. . . . . E. Gilletii

12. Leaves born in a cluster at the top of a stout pseudostem, banana-like; seeds 1.2-2.3 cm. across. . . . . E. ventricosum

MUSA Linnaeus, Species Plantarum 1043 (1753) and Genera Plantarum ed. 5. 466 (1754).

The species supposedly cultivated in the United States are listed alphabetically, with an addendum concerning poorly known species.

Musa acuminata Colla, in Memorie della Reale Accademia delle Scienze di Torino 25: 394 (1820) ["Memoria sul Genere Musa e Monografia del Medesimo"].

M. Cavendishii Lambert ex Paxton, in Magazine of Botany 3: 51 (1837).

M. chinensis Sweet, Hortus Brittanicus, ed. 2: 596 (1830) [name only].

M. zebrina Van Houtte ex Planchon, in Flore des Serres 10: 223, t. 1061-62 (1854-55).

Pseudostems are few to many, 3-5 (-7) m. high, to 25 cm. in diameter at the base, and usually blotched with brown or black. The leaf-sheaths often have a bloom as do the long petioles, these 60-90 cm. long. Blades are 2-2.5 m. long, 40-60 cm. wide, green or green flecked with purplish brown above, green to purple below and sometimes wavy there, the midrib green, greenish yellow, or even red-tinged below. The inflorescence is horizontal or bent downward, its peduncle and rachis usually more or less brown-hairy. White, yellowish, or purple-tinged, and white- or yellow-tipped, female flowers, about 16 per bract in two rows, are borne in the axils of lower bracts which may number ten or occasionally more. The male buds are ovoid to top-shaped and usually pointed at the tip, with faintly ribbed bracts rolled inside one another or much overlapped and in color from bright red to deep violet with a dull bloom outside and light red to yellowish inside. Only one bract lifts at a time, revealing about 20 white, cream, yellowish, pale orange, or sometimes purplish, and pale-lemon-yellow- to orange-tipped, male flowers in two rows. Fruiting bunches vary from nearly horizontal and asymmetric to hanging and compact, with the yellow fruit 8-13 cm. long, 1.5-3 cm. in diameter, pointed away from the ground (not toward the ground as one might assume from bunches hung in produce stores - these are usually upside down). The whitish or creamy to yellow pulp of edible forms is usually seedless. Wild forms produce dull black, smooth, or minutely tuberculate irregularly angular-flattened seeds 6-7 mm. across, about 3 mm. high. The species is native in Ceylon, southern India, Burma, Siam, Indochina, the Malay Peninsula and Archipelago, New Guinea, Australia, Samoa, and the Philippine Islands. Plants on the island of Pemba off the coast of East Africa belong here but it is not known whether they were introduced by man or not.

The wild forms of Musa acuminata are grouped in five subspecies, but many of the edible clones, such as 'Dwarf Cavendish' (once known as Musa Cavendishii and still a greenhouse favorite because of its low stature) are not definitely assignable except to the species in its broad sense. Musa Cavendishii, through critical study, has been shown to belong here. Some writers have assumed that M. Cavendishii (and hence M. acuminata, so far as name is concerned) is the same as Musa nana Loureiro (1790). Dr. Simmonds points out that the identity is not certain, a circumstance that, for the present at least, avoids the necessity of replacing the name M. acuminata with the earlier M. nana. Musa zebrina, another species described from cultivated plants, also proves identical with M. acuminata broadly defined. The leaves of this seeded form are purplish beneath and copiously marked with purplish brown above.

Although it will not ordinarily be necessary to refer them to M. acuminata except in technical work, the following clones listed by Simmonds and Shepherd have been determined as belonging to M. acuminata genetically: 'Bande', 'Mjenga Maua', 'Paka', 'Palembang', 'Pisang Lilan', 'Sikuzani', 'Sucrier', 'Tongat' (all diploid AA); and 'Gitigi', 'Green Red', 'Gros Michel', 'Kitarasa', 'Lujugira', 'Lwekilo', 'Maruthuva', 'Pisang Masak Hinau' ('Lacatan' of Jamaica, not of the Philippines), 'Mutika', 'Nambi', 'Ntobe', 'Orotava', 'Palimbang', 'Rajah' (of the Trinidad collections, not 'Pisang Rajah' of Malaya), 'Rio' (all triploid AAA).

Musa Balbisiana Colla, in Memorie della Reale Accademia delle Scienze di Torino 25: 384 (1820) [Memoria sul Genere Musa e monografia del Medesimo].

Robust green or yellowish-green, only slightly, if at all, blotched pseudo-stems to more than 6 m. high and 30 cm. in diameter are produced in numbers. The leaf-sheaths are often light reddish brown below when old and marked with light brown at the top, frequently with a prominent bloom. Petioles attain a length of 60 cm. and bear green blades (paler or bluish below) to more than 3 m. long, 60 cm. wide. The midrib is green or yellowish green. The peduncle and rachis of the pendulous inflorescence are not hairy. Up to 10 or perhaps 15 clusters of female flowers are borne at the lower nodes, with the whitish to pink-tinged male flowers about 20 per bract in two rows in axils of ribbed dull-purple bracts. These bracts are bluntly tipped with green or yellow and together form an ovoid to ellipsoid bud. The fruit bunch is pendent and compact, with pale-yellow fruits 7-15 cm. long, 4 cm. wide, standing out from the rachis. Black, irregularly rounded, minutely warty seeds 5-6 m. across, 4-5 m. high, are imbedded in whitish pulp. Musa Balbisiana is native in India from Beylon to Assam and Sikkim, in northern Burma, southern China, the Philippine Islands,

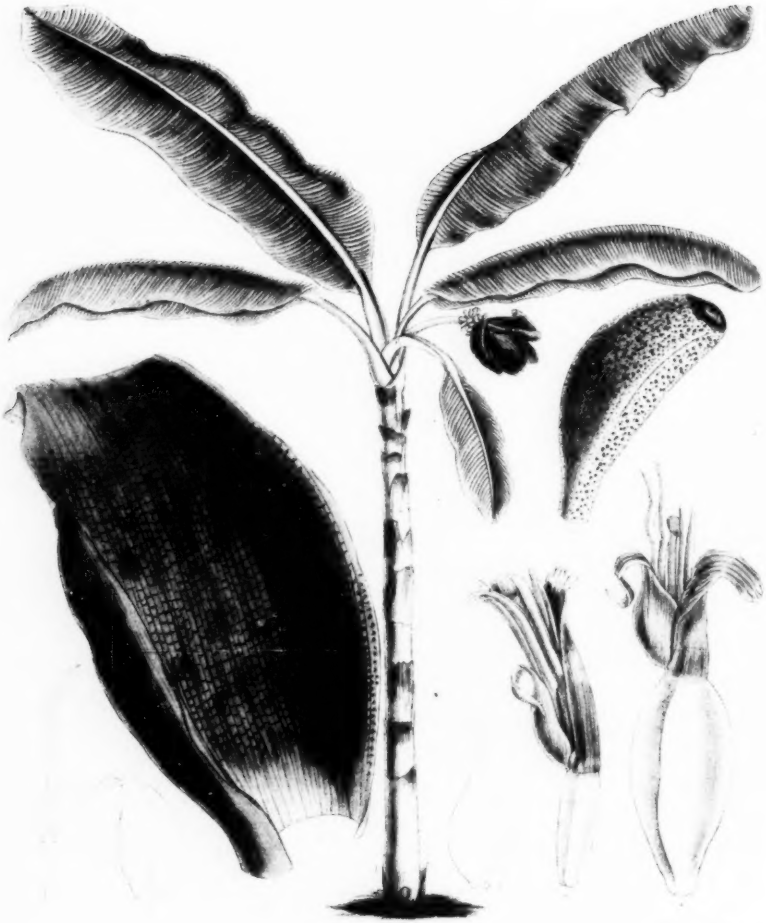

Fig. 51. Musa Basjoo. From Curtis's Botanical Magazine, tab. 7182 (1891).

eastern New Guinea, New Britain, and perhaps Hawaii; also cultivated and perhaps naturalized in Thailand and Malaya, certainly naturalized in Indonesia.

It is possible that Musa Balbisiana is not cultivated to any extent in the United States outside special collections, although frequent in tropical botanical gardens. It deserves mention if only because of the part it has played in the evolution of the edible bananas. Cheesman states that this species has been confused with M. textilis and that plants received in Trinidad as M. textilis, M. Basjoo, and M. Martinii, among other names, have proved to be M. Balbisiana. The species hybridizes with M. textilis in the Philippines, thus adding to the confusion.

Musa Basjoo Siebold & Zuccarini ex Iinuma, Sintei Somoku dzusetsu [The illustrated Flora of Japan] ed. 2, 3: pl. 1 (1874).

Green or yellowish-green pseudostems to 2.5 m. high are usually hidden in part by withered leaf-sheaths, these lightly black-blotched above. The leaves are green above, paler but lacking a bloom below, to 1.5 cm. long, 55 cm. wide, with petioles about 30 cm. long. A minutely hairy peduncle supports a rachis that is horizontal at first but which turns downward above the female flowers, these borne 10-16 per bract in two rows at the lower nodes, the clusters numbering up to six. The small bud is broadly ovoid, obtuse, with overlapping, grooved, yellowish-green or brownish-tinged, deciduous bracts. The bracts lift two or more at a time and are pale yellow within, transversely roughened between the ridges. Male flowers number about 20 per bract in two rows and are cream-colored with yellow tips and lobes. The compact, nearly horizontal fruit bunch bears individual greenish-yellow fruits 5-7 cm. long, 2-3 cm. in diameter, with white pulp and black, warty, irregularly angulate, compressed seeds 6-8 mm. across, 4 mm. high. The species was introduced into Japan from the Ryukyu (Liukiu) Islands and thence to Europe.

Musa Basjoo, the hardiest banana known, was cultivated in southern Japan for fiber but has become popular in horticulture because of its resistance to cold. The material at Trinidad came from Devonshire, England, where it was said to grow in the open. The species shares with one other (M. itinerans from upper Burma) the peculiar habit of developing wide-spreading rhizomes.

The name used by Siebold first appeared in 1830 without a description. Apparently the first effective and valid publication appeared in Iinuma's work, although publication is generally attributed to Baker who wrote the descriptive matter accompanying plate 7182 of Curtis's Botanical Magazine in 1891. In Iinuma's book, a somewhat stylized but recognizable plate is accompanied by a page of text in Japanese which has been translated through the kind of-

Fig. 52. Musa Basjoo. From Iinuma, Sintei Somoku Dzusetzu, vol. 3.

fices of Miss Mitsu Nakayama. The relationship with Musa liukiuensis (Matsumoto) Makino also from the Ryukyu Islands and recently introduced into the United States has not been elaborated.

Musa coccinea Andrews, Botanists Repository pl. 47 (1797).

Green pseudostems to 1.5 m. high, 5 cm. in diameter, are produced in numbers. Leaf-blades to 1 m. long, 25 cm. wide, on petioles to 35 cm. long are dark green above, paler but not bluish below. The erect inflorescence has a short smooth peduncle and bears 1-3 female flowers in each of one to four clusters on a smooth rachis. Bracts are bright scarlet, at least the lower having green leaf-like tips. Those of the male bud persist unwithered for many days, as many as 20 being open at once. Two bright-orange green-tipped male flowers are borne in the axils of the male bracts. The oblong fruit, 4-5 cm. long, 2-2.5 cm. wide, is orange-yellow at maturity. Nearly cylindrical black seeds about 6 mm. long are marked with longitudinal warty ridges, the top slightly longer than the lower portion above the "waist." Seeds are imbedded in white pulp. The species is native in Indochina, and perhaps elsewhere.

Musa coccinea has been cultivated because of its ornamental nature for over 150 years. Its small stature and brilliant inflorescence have made it a favorite for culture indoors. An earlier name, Musa uranoscopos of Loureiro, however, may apply to M. coccinea. At present we cannot be certain that Loureiro described plants identical with M. coccinea and not another closely related species. Until the bananas of Indochina are more critically studied, Cheesman felt that no purpose would be served by using the earlier name. Musa coccinea is continued, therefore, pending a decisive treatment.

Fe'i or Fehi bananas.

The following general description applies to the edible bananas referred to previously in this article as Fe'i bananas (see page 172).

The green pseudostems of Fe'i bananas often weather to dark purple or black below and form large clumps to 7 m. high. Leaves 3-4 m. long, 50-60 cm. wide, are green, as is the petiole which measures 20-30 cm. long and which, when cut, exudes a violet-purple sap. An erect inflorescence bears 2-12 female flowers in each of several hands. The creamy-white but pink-tinged male flowers are 2-4 in the axils of smooth green blunt or pointed bracts. Mature fruit, up to 16 cm. long, 6 cm. wide, is usually coppery orange when mature, with a yellow or yellow-green pulp which is sweetish and astringent when raw. Seeds are usually not formed.

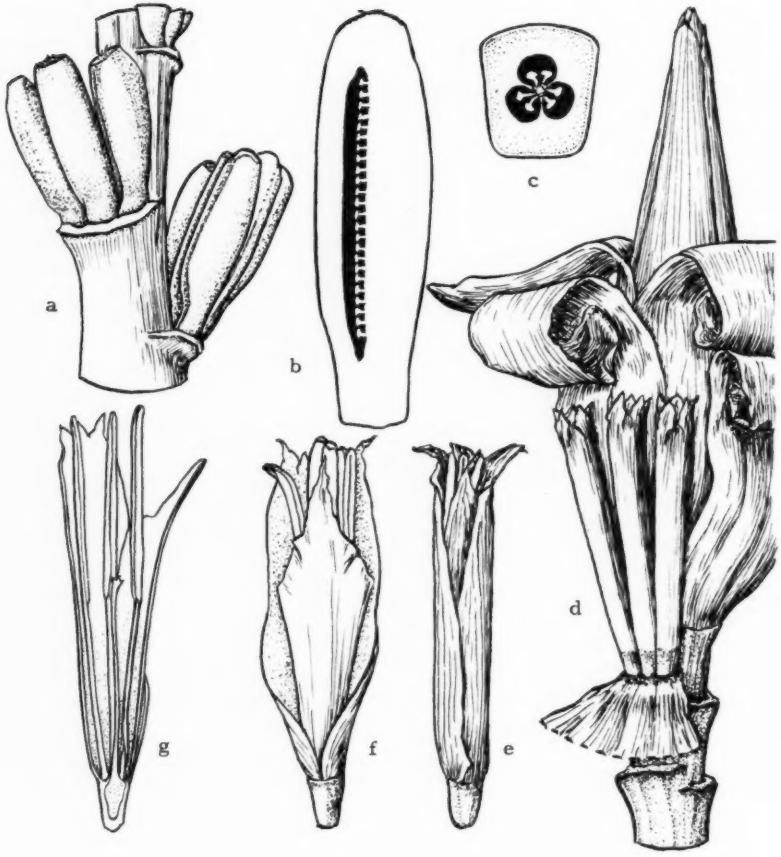

Fig. 53. Musa ornata: a, young fruits x 4/5; b, ovary in vertical section x 1 3/5; c, ovary in cross-section x 2; d, male bud x 4/5; e, staminate flower x 1; f, staminate flower with calyx expanded to show corolla x 1; g, staminate flower in vertical section x 1. (Material for illustration courtesy David Barry, Jr.)

Musa Mannii H. Wendland in Baker, in Hooker filius, The Flora of British India 6: 263 (1892) and in Annals of Botany 7: 222 (1893).

Pseudostems of this small species are about 70 cm. high, 2.5-9 cm. in diameter, and tinged with black. Green leaves with linear-oblong blades to 60 cm. long, 18 cm. wide, have petioles 20 cm. long. The lax smooth inflorescence, about 15 cm. long in the flowering portion, is somewhat inclined but neither horizontal nor recurved. Bracts are rose-colored, subtending yellow male flowers 5 cm. long. The female flowers are 3 in a single row in each of 3 clusters. Mature fruit is greenish, about 5 cm. long, filled with thin pulp and many black seeds about 6 mm. long.

Although plants are currently offered under this name, their identity is not certain. The species itself has never been properly described by contemporary standards and its relatives in far north-eastern India are poorly understood. According to Simmonds (in correspondence), hybrids between species of this alliance produce individuals that could easily but mistakenly be considered distinct species. Thus Musa Mannii must remain, at least for the time being, an enigmatic species.

Musa ornata Roxburgh, Hortus Bengalensis 19 (1814) [name only] & Flora Indica 2: 488 (1824).

Pseudostems are numerous, 1-3 m. high, seldom exceeding 10 cm. in diameter, the pale-green wavy upper parts eventually developing black blotches. Leaves are medium green with a slight bloom and reach 2 m. in length, 35 cm. in width. An erect inflorescence with smooth peduncle bears as many as 7 clusters of deep-orange-yellow female flowers, these being 3-5 in a single row in each bract. The male bud is pointed and top-shaped, with grooved pink bracts yellow at the tip, slightly darker inside. Bracts lift one at a time and are soon deciduous but do not roll back. Three to six small white flowers shading to deep orange at the tip are borne in a single row in the bracts. The compact fruit bunch has pale-greenish-yellow individual fruits 6-8 cm. long, 1.5-2 cm. wide, slightly bent inward. Black, warty, irregularly angular, flattened seeds 5 m. across, 3 mm. high, are imbedded in white pulp.

The name Musa rosacea has been used erroneously for M. ornata for many years. Plants labelled Musa rosea are also likely to belong here. The species is rather widely cultivated in the tropics and is effectively known only from cultivated material, although it may be native in the Chittagang Hills of India. Escapes from cultivation have become naturalized in parts of the New World - in eastern Peru at the far upper edge of the Amazonian plain and probably in Mexico. Musa mexicana Matuda, recently described from the latter country, does not seem to differ significantly from M. ornata.

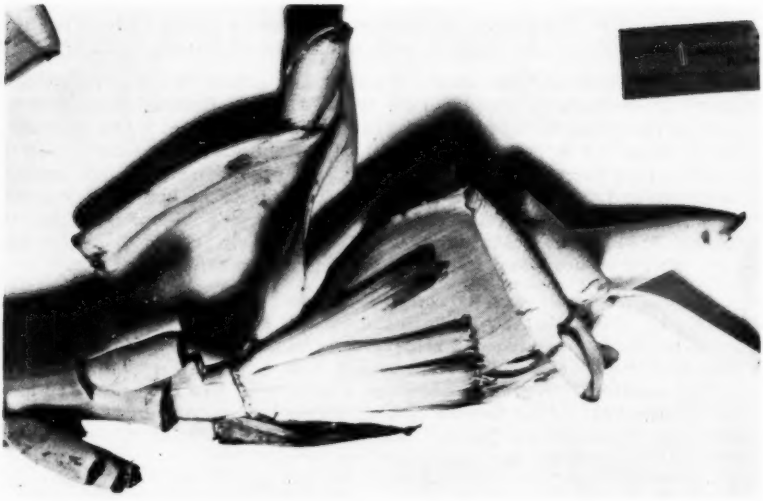

Fig. 54. Musa ornata: inflorescence with young fruits and male bud.

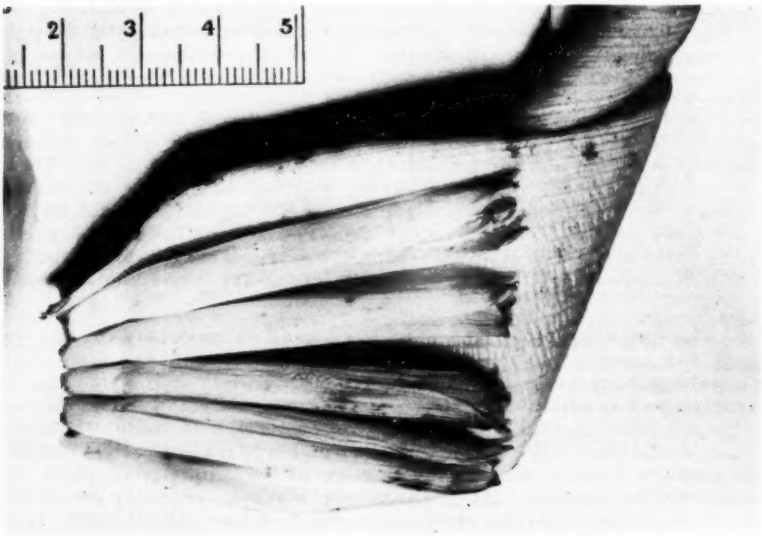

Fig. 55. Musa ornata: bract with staminate flowers.

Musa × paradisiaca Linnaeus, Species Plantarum 1043 (1753) (M. acuminata × M. Balbisiana), "M. paradisiaca."

Musa × sapientum Linnaeus, Systema Naturae, ed. 10: 1303 (1759), M. sapientum."

Under this heading come a number of edible seedless bananas of known hybrid origin and difficult to define as a whole. They resemble one or the other of their parents to a greater or less degree and are not always placeable without genetic and cytological study. These hybrids may be diploid, triploid, or tetraploid. They vary in genetic composition which, for greater clarity, is listed in brackets. Named clones listed by Simmonds and Shepherd follow for reference only, since most would ordinarily be referred to simply by clonal names: 'Ney Poovan' [AB] (diploid); 'Awak Legor' [AAB], 'Bluggoe' [ABB], 'Celat' [AAB], 'French Plantain' [AAB], 'Grindy' [AAB], 'Horn Plantain' [AAB], 'King' [AAB], 'Mysore' [AAB], 'Nadan' [AAB], 'Ney Mannan' [ABB], 'N. Padaththi' [AAB], 'P. B. Bathees' [ABB], 'Pome' [AAB], 'Sept-semaines [AAB], 'Silk' [AAB], 'Peyan' [ABB] (all triploid); and 'Tiparot' [ABBB] (tetraploid).

A Hawaiian clone, 'Aeae', is a striped mutant grown for ornament, sometimes under the erroneous name Musa Koae. At least five shades from near-white to dark green occur on the leaves.

Musa textilis Née, in Anales de Ciencias Naturales 4: 123 (1801). Abacá.

Pseudostems to 4 m. high, 20 cm. in diameter, are numerous and green or more or less purplish or black near the base. The leaf-sheaths are not wavy nor are the petioles, which reach a length of 50 cm. The green blades are 1.5-2 meters long, 40-50 cm. wide. The inflorescence is nearly horizontal, with smooth or minutely hairy peduncle and rachis on which as many as 6 clusters of female flowers are borne, these about 10 in two rows per bract. The male bud, with strongly overlapped, polished, greenish-brown or purplish-brown, sometimes green-tipped, non-grooved bracts, is blunt. The bracts lift one at a time to expose 10-12 white or cream male flowers but may persist for two or three days so that several may be open at once. A lax horizontal fruit bunch has yellow fruit 5-7 cm. long, 2 cm. in diameter, the pale-buff pulp scant, with many rounded-top-shaped smooth seeds 2-3 mm. across, 3-4 mm. high. This species is presumed to be native in the Philippine Islands, where it is much cultivated as a source of Manila hemp, the fiber from the leaf-sheaths. Musa Balbisiana, which occurs as an intruder in plantations, has often been confused with M. textilis and hybridizes with it, so that material labelled as the latter may not be true to name.

Very many named clones of abacá are known in the Philippines but the species has not been carefully studied under controlled conditions. It is occasionally offered for sale as an ornamental in the United States.

Musa velutina H. Wendland & Drude in Gartenflora 24: 65, t. 823 (1875).

Yellowish-green pseudostems to 1.5 m. high, 7 cm. wide, form large clumps and often flower at a height of 1 meter. The leaves, with petioles to 45 cm. long and blades 1 m. long, 35 cm. wide, are shiny dark green above, paler or at fruit bronze-flushed below, the midrib red below. An erect inflorescence has a white-hairy red peduncle and bears 2-4 clusters of bright-orange hermaphrodite flowers below, about 12 clusters of orange-yellow male flowers above, the bracts being pale pink outside, darker within, not grooved, lifted one at a time and bending back and dropping when they fade. The bright-pink hairy fruit 7 cm. long, 3-4 cm. thick, has white pulp and roughened black flattened seeds 4-6 cm. across, 2-3 m. high, which are exposed when the outer skin splits longitudinally in regular fashion and separates in recurving strips that expose the inner mass of pulp and seeds. This species comes from Assam.

It is possible that M. velutina is the same as the earlier M. dasycarpa of Kurz, but until the matter is investigated more fully the more familiar and certain name is retained. This species is unusual in the way in which the fruit-coat splits, revealing the inner pulp and seeds. It is currently offered for sale in the United States.

Species Incompletely Known

In addition to the species more or less adequately known, there are a number of names that are doubtful or improperly listed by dealers. These are listed in following paragraphs.

Musa gigantea O. Kuntze, Revisio Generum Plantarum 2: 691 (1891).

The species, described from plants cultivated in Java and Sumatra, is imperfectly known. It is said to have solitary pseudostems 7-9 m. high, 30 cm. or more in diameter. A pendulous inflorescence 3 m. long bears female flowers in the lower fourth, male flowers above in the axils of spreading, persistent, ovate-oblong bracts 25 cm. long, 11 cm. wide. White flowers 5-6 cm. long number 20-40 in each cluster. The angled fruit is about 5 cm. long and bears 8-10 small pale seeds 1-3 mm. across in a scarcely fleshy pulp.

Until more is known of this species it cannot be placed properly; indeed, it is doubtful that it will ever be certainly identified. Cheesman noted that the habit suggests Ensete, and Nakai formally transferred the species to Ensete in 1948. If plants cultivated under this name are other than a large form of some species already known, it will be necessary to study them at maturity for satisfactory placement.

Musa Martinii A. Van Geert, in Revue de Horticulture Belge et Étrangere 18: 107, fig. 12 (1892).

Two bananas were described at different times with the name Musa Martinii and the name occasionally appears in trade lists or catalogues. Cheesman notes that plants received at Trinidad under this name proved to be Musa Balbisiana. De Wildeman referred the plant of Van Geert to M. Basjoo with a question. What the original Musa Martinii was cannot be ascertained with any certainty.

According to Index Kewensis, the name was used by Carrière in the Revue Horticole for 1890, but the reference is incorrect. The name appears to have been used first in Revue de Horticulture Belge et Étrangere 18: fig. 12 (1892) by A. [A. Van Geert?]. The plants described were grown from seed supposedly received from Teneriffe in the Canary Islands. Stems and nerves of the leaves were reddish, the leaves glaucous above and clear green below (an unusual condition if correctly described). Flowers were said to be of lively rose color though this information could scarcely have been obtained from the young plants. It would appear that this name can be rejected under provisions of the International Code of Botanical Nomenclature, since not only was the description quite inadequate, but the species was only supposed to be new and was not definitely accepted.

A second use of the name appears in Revue Horticole 67: 290 (1895). There Raphael de Noter described plants grown from seed obtained from the mountain Tay-Ninh about a hundred km. from Saigon, in Indochina, and forwarded by M. J. Martin, at that time Director of the Botanical Garden at Hanoi.

The brown-bluish or glaucous apparently solitary stems of the species reached a height of 3-3.5 m., a diameter of 35-40 cm. at the base, and died after fruiting. Leaves to 4 m. long had a red-brown petiole and midrib, a green blade bluish below. The floral bracts were rose and very ornamental, but the small fruits had insipid pulp filled with seeds the size of a very small pea.

Until more is known of this banana from Tay-Ninh, it, too, must remain a questionable species. F. Gagnepain, in Flore Générale de I'Indo-Chine 6: 142 (1932), listed it without further information and thought it possibly a form of an edible banana.

Musa Maurelii

Young plants of a handsome banana with leaves red below, deep green suffused with red above, especially along the margins, are currently offered for sale by the California Jungle Gardens under the name Musa Maurelii. Through the kindness of David Barry, Jr., proprietor of the nursery, the source of this name, which has not been listed by Index Kewensis, has been located. It first appeared in an article on red-leaved bananas of Abyssinia by D. Bois (Bulletin du Muséum National d' Histoire Naturelle ser. 2, 2: 688 [1930]).

In this article, Bois described a variety Montbeliardii of Musa Ensete (now Ensete ventricosum) and a variety Maurelii, ascribed to an unnamed species which he considered distinct from but in the same group of species as Musa Ensete. In the text, however, he used the name Musa Maurelii, honoring Maurel, once Director of the École de l'Alliance Française d' Addis-Abéba at Harrar.

Since Bois admittedly did not know to what species the variety should be attached, and since it was based only on characters of the foliage, the name Musa Maurelii has no proper botanical standing under Article 33 of the Code. Although surely belonging to the genus Ensete as it is defined here, no further disposition of this name can be made until flowers and fruits with seed can be obtained. At this writing, Mr. Barry's plants have not yet flowered but it is hoped that they will soon do so, at which time a further report can be given.

Musa nepalensis Wallich in Roxburgh, Flora Indica 2: 492 (1824).

Musa nepalensis was described in detail by Wallich principally from two large unpublished drawings now in the herbarium at Kew, according to Baker. Wallich questioned whether it was distinct from M. superba (Ensete superbum) or whether it was intermediate between that species and another, M. glauca (Ensete glaucum). Subsequent writers have questioned the position and actual existence of the species. Apparently it belongs in Ensete if it does, indeed, exist. Although Wallich mentioned plants that he had brought to Calcutta and which he apparently intended to study further, there appears to be no definite record of M. nepalensis in cultivation. Seed purportedly of this species has been listed by one domestic and one foreign source since 1950 but I have not seen living plants.

Musa oranocensis

This name, though it was once listed for plants offered in the trade, has no botanical standing, and should be dropped. Plants to which the name was applied were thought to be a form of an edible banana.

Musa rosacea Jacquin in Plantarum rariorum Horti Caesarei Schoenbrunnensis 4: 22, t. 445 (1804).

The name Musa rosacea has been widely misapplied to M. ornata since 1822. Cheesman has pointed out that true M. rosacea was apparently an edible seedless banana closely related to M. Balbisiana and probably referable to M. × paradisiaca (M. sapientum as used by Cheesman in 1949). It is unlikely that the name can be placed more definitely, and M. ornata should be used for most, if not all, plants grown as M. rosacea.

Musa rosea Herbarium Calcutta ex Baker, in Annals of Botany 7: 221 (1893).

Musa rosea is another name of confused application that has only recently appeared in the United States. The exact identity of Baker's species, based on dried specimens in the herbarium at Calcutta, has not been determined. It seems likely, however, that cultivated plants bearing the name are referable to M. ornata. Baker's description of M. rosea is reproduced here for comparison.

> Habit of M. coccinea, but leaves much shorter and broader in proportion to length, thin, green, about a foot long by half as broad, deltoid at the base and apex; petiole deeply channelled, nearly as long as the blade. Panicle short, erect; rachis pubescent, not flexuous; bracts pale red; lower lanceolate, half a foot long; upper oblong, obtuse, about 2 in. long; flowers 2-3 in a cluster. Calyx an inch long; petal as long as the calyx. Fruit and seeds not seen. Described from two specimens in the Calcutta Herbarium, dried from the Botanic Garden in June 1882.

Musa sumatrana Beccari ex André, in L'Illustration Horticole 27: 37, pl. 375 (1880).

Musa sumatrana is another species described from a juvenile plant. This had strongly purple-barred leaves like the extreme form of M. zebrina (M. acuminata). Baker and Ridley have attributed added characters to the species from material of dubious origin. However, a Beccari specimen in the herbarium at Kew has fruit in two series as in M. acuminata and Beccari's later remarks, when describing Musa microcarpa, indicate an affinity to M. acuminata. A recent discovery of bananas on Sumatra may soon provide the final evidence for a definitive disposition of this species.

ENSETE Bruce ex Horaninow, Prodromus Monographiae Scitamineae rum 40 (1862).

The genus Ensete is similar to Musa but is distinguished by characters listed in the key on page 175. Species are few, occurring in tropical Africa generally, India, Burma, Thailand, Indo-

china, South China, the Philippines, and New Guinea. Only three species are definitely known to be cultivated. Musa gigantea, listed on page 186, and plants known as Musa Maurelii (page 188), probably belong in Ensete.

Under usual circumstances, plants flower, fruit, and then die. It should be noted, however, that the foliage will die back in nature during the dry season or due to other unfavorable circumstances in at least one species, then reappear without loss of the plant, and it is usual for plants to grow for several years before reaching maturity. In the wild state, seeds often germinate together in situ so that what superficially appear to be clumps, like those of Musa, are formed. Suckering is artificially induced by Abyssinian peoples. The large seeds of Ensete are used as ornaments, particularly in necklaces, and the fermented leaves of E. ventricosum are used by Africans in the preparation of a heavy bread.

Ensete was first noted by the Scottish traveler James Bruce in his book "Travels to discover the source of the Nile, in 1768-73," but the first proper description appeared in the work of Horaninow (also spelled Goryaninov or Ghoryaninov) cited above.

Ensete Gilletii (De Wildeman) Cheesman, in Kew Bulletin 1947: 103 (1947).

Musa Gilletii De Wildeman, in Revue des Cultures Coloniales 8: 102 (1901).

Pseudostems reach a height of 2 meters or slightly more and are somewhat swollen at the base, reaching maturity in about three years. Elliptic-lanceolate green leaf-blades to 1.5 meters long are borne on stout petioles along the stem in canna-like fashion, decreasing in size toward the recurved short-peduncled inflorescence. This is about 48 cm. long, with persistent green ovate-lanceolate bracts to 25 cm. long and nearly 9 cm. wide. Fertile flowers numbering 10-11 are borne in 2 ranks in the axils of each of the lower 10-12 bracts. The flowers are 2-3 cm. long. Mature fruit, to 5.5 cm. long, 2.5 cm. wide, is angled, oblong or nearly pear-shaped, grayish outside, with about 23 shining black seeds 7-10 mm. across lodged in whitish dry pulp.

Ensete Gilletii is native in western Africa from Sierra Leone to Angola, where it is thought to inhabit drier locations than those of the more easterly E. ventricosum. The leaves, borne along the stem rather than in a distinct crown, distinguish the species from E. ventricosum, as do the smaller seeds.

It is unlikely that Ensete Gilletii is grown under this name but it is included in the list of cultivated species because, judging from indirect evidence, it is probably the correct name for plants grown as Musa religiosa Dybowski. The latter was so incompletely des-

Fig. 56. Ensete ventricosum. From Curtis's Botanical Magazine, tab. 5223 [Musa Ensete] (1861).

cribed (in Revue Horticole 72: 262 [1901]) that the name on its own merit cannot be applied definitely. It should, therefore, be ignored except in lists reserved for names of uncertain application.

Ensete superbum (Roxburgh) Cheesman, in Kew Bulletin 1947: 100 (1947).

Musa superba Roxburgh, Hortus Bengalensis 19 (1814) [name only] and Flora Indica 2: 489 (1824).

Pseudostems of Ensete superbum are swollen to as much as 2.5 meters or slightly more in circumference at the base, and are about 1 meter high though the entire plant may reach a height of 4 meters. Bright-green leaves measure to 3 meters long, 1 meter wide, on petioles 50 cm. long. The inflorescence bears spreading green orbicular bracts, dull claret-brown inside, with 20-30 flowers in 2 rows in each bract. The dry fruit bears numerous dark-brown or black seeds 8-12 mm. wide, in 2 rows in each cell.

Ensete superbum is not widely cultivated nor is it adequately known botanically. Its native habitat is the Western Ghats of India. The short conical stem serves to distinguish the species.

Ensete ventricosum (Welwitsch) Cheesman, in Kew Bulletin 1947: 101 (1947).

Musa Ensete Gmelin, Systema Naturae, ed. 3, 2: 567 (1791).

Musa ventricosum Welwitsch, Apontamentas Phyto-Geographicos 545, 587, no. 45 (1858).

Musa Arnoldiana De Wildeman, in Bulletin de la Société des Études Coloniales, Bruxelles, 8: 339 (1910).

The much swollen pseudostems of Ensete ventricosum may reach a height of 5 meters, plants being 4-9 m. in overall height. Firm spreading-erect yellow-green leaves with purple-brown midrib below are borne in a distinct crown from short petioles and measure to 6 meters in length. The inflorescence, more than 1 meter long, eventually droops, with the greenish-brown bracts spreading from its terminal half. Fertile flowers are borne in the axils of the lower bracts; male flowers above, the latter to about 20 in a single row. The fruit is oblong to nearly pear-shaped, to nearly 10 cm. long, with several large black glossy seeds 12-17 mm. in diameter.

Ensete ventricosum, more frequently known as Musa Ensete, occurs to the east of Ensete Gilletii, being an inhabitant of moist places through central and east Africa. It is widely used as a food plant, having been so used since the times of early Egyptian civilization. The synonyms given here are limited to the few that pertain to material offered for sale in the United States. A complete synonymy is given by Baker and Simmonds (1953).

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[1] See also Simmonds, N. W. for continuation "t" and "u."

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The Macmillan Company has just published "African Violets, Gloxinias, and their relatives," written by Dr. Harold E. Moore, Jr. of the Bailey Hortorium staff who has contributed many articles on this group of plants to Baileya. As the subtitle - "A Guide to the Cultivated Gesneriads" - suggests, all the members of the family Gesneriaceae known to be in cultivation in America have been included, and this comprehensive treatment should make it valuable and interesting not only to the many gardeners who have a special enthusiasm for the gesneriads, but also to window-gardeners and glass-house owners in general.

Part One, Growing Gesneriads, is concerned with gesneriads in the wild, with their culture, propagation, pests and diseases, and their hybrids and hybridization. Part Two, Kinds of Gesneriads, occupies the larger part of the volume, and includes keys for identification, descriptions, and notes on the various cultivated genera and species. Part Three, the Appendices, contains more technical information, such as the accepted names and synonymy of the species included, the pronunciation and meaning of their names, chromosome numbers, selected references, and a glossary.

There are 323 pages of text. The 57 colored plates and 50 black and white figures, illustrating the habit and diagnostic characters of most of the genera and many of the species, were reproduced from original paintings and drawings prepared by Marion Ruff Sheehan, formerly staff artist at the Hortorium. The price is ten dollars.

The Boat-lily (Rhoeo spathacea)

William T. Stearn
British Museum (Natural History)
London

The boat-lily or oyster-lily of English-speaking countries,[1] "cordoban" of Cuba, "sangria" or "sanguinaria" of Puerto Rico, "señoritas embaracadas" of Honduras, "Adam en Eva" of Dutch islands, is a member of the Commelinaceae well known in gardens and extensively naturalized in tropical America. It makes clumps of almost erect sword-like leaves up to 4.5 cm. long, 5 cm. wide, dark green above and usually purple beneath, near the base of which nestle the laterally produced many-flowered inflorescences with large firm boat-like spathaceous bracts. The individual flowers are small and fugitive. They have three equal white petals free to the base, six stamens more or less equal and all fertile, and one ovule to each chamber of the ovary. These characters in combination set it apart from other Commelinaceae and led Hance in 1852 to place it in a genus by itself which, for some reason unexplained, he named Rhoeo. Earlier authors included it in Tradescantia. It can be easily recognized by its habit of growth and its spathaceous bracts; to these Rhoeo owes most of its vernacular names.

Today this plant is widespread in Jamaica and has all the appearance of being native; it grows on cliffs, rocks, and old walls. It was, however, unknown to the pioneer investigators of the Jamaican flora, Sir Hans Sloane (1660-1753) and Patrick Browne (1720-90), neither of whom would have left so conspicuous and well-marked a plant unrecorded had it occurred during their time at the places in Jamaica where it abounds now. The first reference to this species was made by Olof Swartz (1760-1818), who botanized extensively in Jamaica between 1784 and 1786. He published it in his Nova Genera et Species Plantarum seu Prodromus 57 (1788) under the name Tradescantia spathacea, giving its provenance as "India occidentalis, Campechia," not Jamaica. In a later publication, Flora Indiae occidentalis I: 607 (1797), Swartz stated that it had been brought to Jamaica from the mainland bordering the Gulf of Campeche; evidently he knew it only as a cultivated plant.

[1] [In the United States, Moses-in-the-bullrushes and three-men-in-a-boat are more commonly encountered vernacular names for this plant - Ed.]

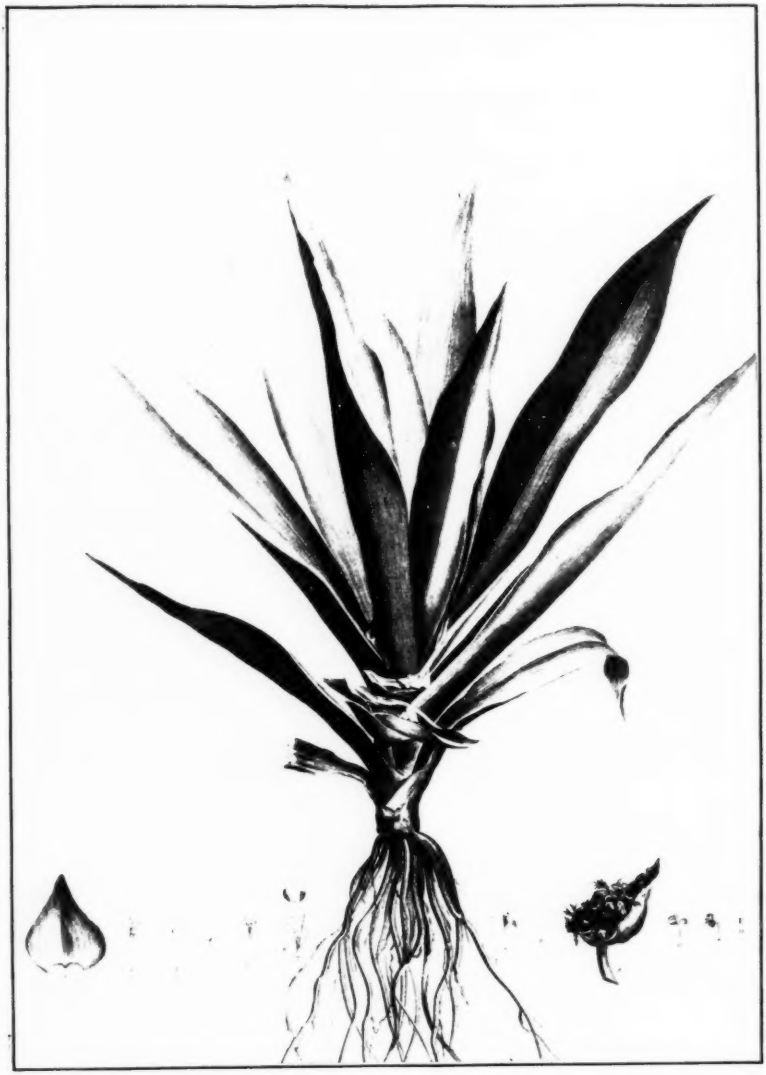

Fig. 57. Rhoeo spathacea. From L'Heritier, Sertum Anglicum 8, t. 12 [Tradescantia discolor].

Aiton in 1789 recorded that it had been introduced into Britain in 1783 by Matthew Wallen, who was a keen gardener resident in Jamaica and a good friend to Swartz. Smith in 1792 was more explicit: "Mr. Masson observing this plant cultivated in Jamaica, to which place it had been brought by a ship from that part of South America called the Mosquito-shore, no sooner described it to the English Botanists, than they became anxious to acquire so beautiful and singular a production, and at length, by the favour of Mr. Wallen, it was sent to Europe." Frederick Masson (1741-1805) visited Jamaica in 1781, so it had evidently been introduced into the island by then, although not from South America but from Central America; the Mosquito-shore or Mosquitia, the territory of the Mosquito (or Mesekito) Indians in what is now Nicaragua, was from 1655 to 1856 a British Protectorate linked to Jamaica. As self-ruling but faithful allies of the British, the Mosquito Indians maintained their independence and fought successfully against the Spaniards on the mainland and against the Maroons in Jamaica; their princes were educated in Jamaica and their kings crowned in British Honduras or Jamaica until the Dallas-Clarendon treaty of 1856, when, in deference to the opinion of the United States that the sovereignty of indigenous American peoples was "a mere right of occupancy... to be extinguished at will," Britain reluctantly abandoned them to ultimate annexation by their Nicaraguan enemies.[1]

In view, then, of the former close connection between Jamaica and the Mosquito Shore, there is no reason to doubt Smith's statement indicating the Caribbean coast of Nicaragua as the area whence this now widely naturalized plant was introduced into cultivation.

Swartz's name Tradescantia spathacea never came into use. Later, in 1788 or 1789, L'Heritier published a detailed account and plate under the name Tradescantia discolor in his Sertum Anglicum 8, t. 12 and as such it was illustrated in Smith's Icones pictae Plantarum Rariorum t. 10 (1792), in the Botanical Magazine 30:t. 1192 (1809), and Redouté's Liliacées 3: t. 168 (1807). Hance adopted L'Heritier's epithet discolor when transferring the species from Tradescantia to Rhoeo.

There has been some doubt as to the exact date of publication of Swartz's Prodromus. From Swartz's correspondence with Sir Joseph Banks, Jonas Dryander, and Carl Peter Thunberg, it is now evident that his Prodromus was published between June 20, 1788 and July 31, 1788; it thus antedates L'Heritier's Sertum Anglicum, of which the first part appeared at the end of 1788 or in January 1789, according to Britten & Woodward in Journal of Botany 43:272 (1905). The epithet spathacea thus has priority over discolor and under the International Code of Botanical Nomenclature must be restored.

[1] Cf. S. L. Caiger, British Honduras, Past and Present, 101-119; H. Luke, Caribbean Circuit, 50-50; N. P. Macdonald, "Britain and an Atlantic-Pacific Canal," History Today 7: 676-687 (1957).

The correct botanical name for the boat-lily is accordingly Rhoeo spathacea with the following synonymy:

Rhoeo spathacea (Swartz) Stearn.

Tradescantia spathacea Swartz, Prodromus 57 (June or July 1788).

Tradescantia discolor L'Heritier, Sertum Anglicum 8:t. 12 (Dec. 1788 or Jan. 1789); Aiton, Hortus Kewensis I: 403 (1789) Smith, Icones pictae Plantarum Rariorum t. 10 (1792); Swartz, Flora Indiae occidentalis I:607 (1797).

Ephemerum discolor (L'Heritier) Moench, Supplementum, Methodus Plantas... 78 (1802).

Rhoeo discolor (L'Heritier) Hance in Walpers, Annales 3: 660 (1853).

The typical form of this species has the leaves purple beneath. In Central America it also occurs with the leaves green on both sides. For horticultural purposes this form may be distinguished as cv. 'Concolor'; it was described and illustrated as Tradescantia discolor var. concolor Baker in Saunders' Refugium Botanicum 1: t. 48(1868). There is also a variegated cultivar 'Variegata', having the leaves purple beneath but variegated with longitudinal yellowish lines on the otherwise dark-green upper side; this was described and illustrated as T. discolor var. variegata Hooker in Botanical Magazine 84: t. 5079 (1858).

Book Review

"The Complete Book of Chrysanthemums" by Cornelius Ackerson. 256 pp., with 23 colored and 30 black and white photographs, several line drawings. Doubleday and Co., Inc., New York. 1957. Price, $4.95.

Specialization is today as characteristic of horticulture as it is of many other aspects of our civilization, and many an amateur gardener and many a commercial plantsman who start with a catholic interest in ornamental plants eventually find themselves devoted almost completely to a single group or kind. This book is for such of these who have so far succumbed to the allures of the chrysanthemum that they can no longer be satisfied with the usual few clumps scattered in the perennial border.

Mr. Ackerson is president of the National Chrysanthemum Society and editor of its bulletin, positions which evidence his own enthusiasm for and experience with these plants. His book treats practically every conceivable phase of the subject likely to be of interest to the hobbyist or the commercial grower, including chapters on arranging the flowers, exhibiting them, making a profit from them, their classification into bloom types, as well as the to-be-expected chapters on the various details involved in successfully growing and bringing them into bloom. A short history of the discovery, introduction, and development of the chrysanthemum is made the subject of another chapter, and species other than C. morifolium (the plant which has almost completely usurped the common name chrysanthemum) which are of horticultural importance are very briefly described also.

As a botanist interested in cultivated plants, I cannot help wishing that somewhere early in the book there had been provided a labelled diagram showing a chrysanthemum head in vertical section, to illustrate its structure and component parts. Then the author, throughout the text, could have referred correctly yet perfectly intelligibly to the various structures as disk florets, ray florets, achenes. Instead, he most often refers to the ray florets as ray petals (as on page 4, "ray petals surrounding the central disk of small tubular petals"[!]), and on page 125 speaks of "enlargement of the seed capsules." I do not believe this is being pedantic - an enthusiasm which extends to every other aspect of the chrysanthemum should include an interest in understanding the structure and simple but correct terminology of the head (in the book usually called the "bloom") which is, after all, the real center of all the enthusiasm in the first place.

The glossary near the end of the book is not so good as it ought to be, for many of the definitions are awkward, unenlightening, or inaccurate, as though the author himself did not always have a very clear understanding of the precise meanings of the terms. In the chapter on flower arranging, Mr. Ackerson seems somewhat beyond his depth in handling the usual abstractions involved - symmetry and balance are confused, for instance - and the three line drawings illustrating types of arrangements are lamentable both as drawings and as examples of arrangements, although the photographs in color of Myra Brooks' arrangements are handsome.

The publishers deserve a word of commendation for having been able to produce such an attractive and well-illustrated book at what is quite a reasonable price for its type. It was done entirely by offset lithography, and is a fine example of this method of printing.

W. J. D.

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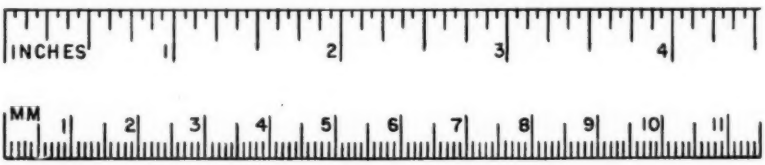
ABBREVIATIONS USED IN BAILEYA

ann.	annual	dm.	decimeter	lf.	leaf
bien.	biennial	fl.	flower	lft.	leaflet
br.	branch	fls.	flowers	lvs.	leaves
brt.	branchlet	flt.	floret	mm.	millimeter
caps.	capsule	fr.	fruit	per.	perennial
cl.	clone	ft.	foot	segm.	segment
cm.	centimeter	hort.	horticultural	st.	stem
cv.	cultivar	in.	inch	sts.	stems
diam.	diameter	infl.	inflorescence	var.	variety

METRIC - ENGLISH EQUIVALENTS (approximate)

6 mm. - 1/4 in.	10 cm. - 4 in.	10 mm. - 1 cm.
12 mm. - 1/2 in.	1 dm. - 4 in.	10 cm. - 1 dm.
25 mm. - 1 in.	3 dm. - 1 ft.	10 dm. - 1 meter
2.5 cm. - 1 in.	10 dm. - 1 yd.	
5 cm. - 2 in.	1 m. - 39 in.